
SIGILLVM ACADEMIÆ HARVARDIANÆ IN NOV: ANG:
CHRISTO ET ECCLESIÆ

OUTLINES

OF

THEORETICAL LOGIC.

Cambridge:
Printed at the University Press,

FOR MACMILLAN & Co.

London: BELL AND DALDY.
Oxford: J. H. AND JAMES PARKER.
Edinburgh: EDMONSTON AND DOUGLAS.
Dublin: WILLIAM ROBERTSON.
Glasgow: JAMES MACLEHOSE.

OUTLINES

OF

THEORETICAL LOGIC.

FOUNDED ON THE NEW ANALYTIC OF
SIR WILLIAM HAMILTON.

Designed for a Text-book in Schools and Colleges.

BY

C. MANSFIELD INGLEBY, M.A.
OF TRINITY COLLEGE, CAMBRIDGE.
TEACHER OF METAPHYSICS AND LOGIC IN THE INDUSTRIAL DEPARTMENT OF THE
BIRMINGHAM AND MIDLAND INSTITUTE.

Cambridge:
MACMILLAN AND Co.
1856.

1860. May 24.
Gray Fund.

2/8 + 1/8 = $ .76.

PREFACE.

The following pages are designed to form the basis of class-instruction in the science of Theoretical Logic. As many modern works of this kind are in circulation, a few words may be expected in explanation of the motives which have induced me to give this treatise to the public. The discoveries of Sir William Hamilton, upon which these outlines are mainly founded, do not date further back than 1840, in which year they were first promulgated. Of the treatises which have been published since that date two only profess to embody those discoveries, and those two are not fitted to form the text-book of a lecture-room. All other treatises are deficient in several of the staple subjects of the science, and the majority intrench upon the domains of Language, Rhetoric, and Philosophy. A good text-book is therefore a desideratum. Accordingly, when I commenced my lectures at the Institute, I was thrown entirely on my own resources for the exposition of several important branches of the science; and it was not long before a request was preferred to me by several of my class to print for their benefit certain of the notes with which I had furnished them, and which consumed much time in dictation.

The peculiar characteristics of the following treatise are (1) the doctrine of extension and intension, (2) the quantification of the predicate, (3) the solution of opposed propositions, (4) the reduction of the thirty-six moods in each figure to nine essential moods, (5) the evolution of all additional moods caused by the introduction of the sign of partial quantity on the one hand, and by the ultra-total quantification of the middle term on the other, and (6) the doctrine of induction. The treatise is likewise characterised by the exclusion therefrom of the doctrine of modals, and of enthymemes and sorites.

In the treatment of syllogisms I have employed no scheme of pictorial notation, for the simple reason that I am thoroughly convinced of the general uselessness of any such, and therefore strongly deprecate its use. I am acquainted with the schemes of Euler, Ploucquet, Lambert, Hamilton, and Boole, of which I take Lambert's to be the best; but I am far from thinking it desirable to trouble the student with it.

In the course of the following pages I have not scrupled to avail myself of the demonstrations of others; and where I have found such expressed with a truth, clearness, and precision, which I should despair of approaching, I have transplanted into my own work as much as I found necessary, in all cases (except in the statement of the canons of syllogisms, which are taken from Sir William Hamilton's Disquisitions) acknowledging the obligation by annexing the name of the author. But inasmuch as in all such cases I have not unfrequently amended the grammatical construction, I have been unable to indicate the extracts by the usual addition of " ".

I have already stated the immediate design of my work; independently of that, I have sufficient faith in my own labours to entertain the hope that they may not be without influence upon logic as a branch of liberal education in the Universities. This hope will be fully realised, as far as Cambridge is concerned, if I am in the most indirect manner instrumental in giving logic a place in the curriculum of her studies, and thus removing from her a stigma as disgraceful as it is peculiar.

My claims to originality are small: they are confined to the treatment of logical opposition and the principle of the congruity of syllogisms. In stating the thirty-six moods of the syllogism I have not borrowed from any other writer, but have drawn them up from my own investigation. However, I believe they will be found to agree with those of Sir William Hamilton.

BIRMINGHAM,
July 21st, 1856.

CORRECTIONS.

The following Errata *occurred through the negligence entailed on the Author's illness; he trusts they are the only blunders which disfigure this little work.*

P. 56. 4th line from the bottom, *for* 'argument' *read* agreement.
P. 63. 13th line from the top, the word 'All' should be enclosed in [ ]
P. 64. 8th line from the top, the brackets enclosing the word 'Any' should be transferred to the 'All' of the preceding line.
P. 72. 7th line from the bottom, the word 'Certain' on the right hand should be enclosed in [ ]
P. 73. 8th line from the top, the word 'Certain' to be preceded by a [
—— 4th line from the bottom, the word 'Certain' to be enclosed in [ ]

N.B. It would be better in pages 72 and 73 to substitute (Certain) for [Certain] wherever the latter occurs, inasmuch as the [ ] have been appropriated to distinguish the redundancy of the sign of quantity 'All.'

In page 57, in the 6th and 9th lines from the bottom, the word 'definite' (which is used by Baynes) is equivocal, and should be replaced by the word 'determinate.'

INTRODUCTION.

OF THE DEFINITION AND SPHERE OF THEORETICAL LOGIC.

THEORETICAL Logic is the Science of the Laws of Thought.

Thought is conversant with 1 Conception, 2 Judgment, 3 Reasoning, 4 Science.

The mind, in performing the act of conception, forms a Concept of every object of thought.

Conception is the process, the concept is the product.

A Concept is the cognition or idea of the general attribute or attributes in which a plurality of objects coincide (HAMILTON).

This process of conception obviously involves the perception of a number of objects, their comparison, the recognition of their points of similarity, and their subjective union by this common attribute (BAYNES).

Accordingly a concept may either refer to an individual or to a species (that is, a class comprehending several individuals) or to a genus (that is, a class comprehending several species) or to higher classes.

Judgment is the action of referring one concept to another. The result of such action put into words is a sentence expressing the relation between two concepts. The concepts in such a sentence are called the Terms, and the sentence itself is called the Proposition.

A proposition is an expression that two notions or concepts can or cannot be reconciled (THOMSON).

Reasoning is concerned with the relation that subsists between two propositions. The two being compared, the result is the generation of a third proposition.

In certain cases (which will be explained in the right place) an inference expressed in words is called a simple Illation; in other cases, a Syllogism.

A system of such illations and syllogisms, concatenated according to the laws of logical progression, is called an Organon.

An organon may be either for the discovery of truth or for imparting it to others.

What logic is not.

Logic is not concerned with the philosophy of language, or in any way with the means of expressing what is thought.

Language expresses all that is thought. Logic is the instrument of which language is the material, and philosophy the result. As the prerequisite of philosophy is logic, so the prerequisite of logic is language. Logic abhors an ellipsis. When an ellipsis is presented to logic, logic demands whether the ellipsis is an ellipsis of thought, or of language merely; whether there is, in point of fact, an uncertainty in thought which language has faithfully expressed; or whether the thought is simple, sure, clear, and language has introduced the ellipsis as an idiom merely. If the thought is uncertain, logic applies itself to deal with the ellipsis, which is the faithful exponent of that thought; but it may oblige language to eliminate the ellipsis for the sake of clearness and precision. If however the ellipsis is one of language merely, the thought being explicit, logic will not deal with the ellipsis at all, but will demand, as the prerequisite of its action, that the ellipsis should be eliminated, and the implicit thought should be rendered explicit in language. In all cases logic deals with what is thought, and with that only.

Logic does not concern itself with any existing real objects, nor with the content or matter contained in any term or proposition.

As language deals with the representation of thoughts with a view to the communication of them from one thinker to another, philosophy regards only the matter, the content of those thoughts, and the evolution of practical truth. Now logic being the instrument that enables philosophy to deal with language, it is an intrusion for logic to pretend to deal with the matter or content of thoughts. Philosophy requires logic to furnish the formal organon for the investigation of practical truth, i. e. the determination of facts. In all cases then, logic deals with the form of what is thought, with concepts, and their relation in judgment and inference.

A term may refer to an actually existing thing, or to a class under which several objects are subsumed.

But logic has nothing to do with the concrete object, that is, the object considered in itself, but solely with the concept of which the term is the sign.

So also a proposition may be true or false, or it may express a contingent truth or an apodictic truth (an universal and necessary truth).

But logic has nothing to do with these things, it is concerned only with the form of the proposition.

Accordingly the only fallacies of reasoning that logic can take cognizance of, are departures from the formal laws of the syllogism; all other fallacies belong to physics or to metaphysics.

So also logic has nothing to do with the advisability of suppressing a premiss, or otherwise accommodating an argument to the habits of thought of men in general. Such matters belong exclusively to rhetoric.

From the above remarks, it is plain that neither the doctrine of Modals, nor any exposition of Enthymemes or Sorites, ought to find place in a treatise on logic.

PART I.

OF TERMS.

HAD man no power of classifying in intellect the confused multitude of objects presented to the senses, he must remain for ever destitute of anything worthy of the name of knowledge. With no clear recognition, even of the individual, since comparison and discrimination would be impossible, he must for ever abide amidst the obscurity and vagueness in which knowledge commences—helpless amidst a multiplicity of objects which he could not comprehend—bewildered by a confusion which there would be no possibility of recalling to order. The earliest effort of the mind is accordingly directed to extricate itself from this confusion, and this determines the exercise of the comparative faculty, and the formation of concepts (BAYNES).

Amidst the multitude of confused objects presented to the mind in perception (apprehension), some are found to affect us similarly in certain respects. These objects the mind considers; by comparison it recognises their resembling qualities; by attention these qualities are exclusively considered, since the concentration of the mind on them involves of necessity its abstraction from those in which they are severally dissimilar. Since the resembling attributes which these various objects possess in common cannot, when separately considered, be discriminated, the objects themselves are, in this restricted point of view, necessarily considered as one. In other words, the understanding grasps into unity a multitude of objects (severally distinct) by a common feature of identity. On this unity thus formed it sets the seal of a name, that it may be enabled ever afterwards at once to discriminate the various objects of its knowledge, and commodiously to refer each to its own class, and thus be saved the endless labour of enumerating all the particulars by which objects are individually discriminated. A notion is thus a purely ideal or subjective whole which the mind, from the limitation of its power, is necessitated to form in order to classify in thought, and discriminate in language, the various objects of its knowledge (BAYNES).

This being the case it is obvious that a concept can afford only a partial knowledge, and has only a relative existence. It can only afford a partial knowledge, since it embraces some only of the many marks by which an object is known. It has only a relative existence, since this knowledge is not given absolutely, but only in connection with some one of the objects to which the concept is related. (For a notion though potentially applicable to all the objects which it contains, can only be truly known on occasion of its being actually applied to some one of these objects. This is at once the test and the evidence of its relative character: and this being its character, it is obviously altogether dependent on the objects from which it is formed). A concept has thus in its totality a purely subjective existence destitute of any objective reality. Being what it is, namely, an ideal whole, subsisting only by relation to the objects whose resembling parts it embraces, it is obvious that, as it has no independent existence, it can convey to us no independent knowledge; and that if we destroy the objects, we destroy the resembling attributes in each; and destroying the resembling parts we annihilate the whole which they together constituted (namely, the concept). As however a concept has only a subjective being, existence and knowledge are here identity. If no qualities be discriminated in objects as similar, we have no knowledge of a concept, that is, no concept exists. If we cannot assign an object to any class, that is, cannot say that it does or does not belong to any concept, we do not understand or comprehend it. We think an object, that is, recognise it to be what it is, only as we think it under some concept.

Concepts being thus formed, the great prerequisite of logic is, that they shall be expressed in language. In every part of logic grammar is called upon to express everything that is contained in thought, whether impliedly or not. The triumph of language is the expression of a perfect analysis of thought. Concepts considered through the medium of a name are called Terms. Let us suppose that the mind is taking cognisance of a number of objects, and has discerned in each some common point of resemblance. Let us suppose that this point of resemblance has been considered apart from the object, and that the concept of the common attribute has received the seal of a substantive name. This name henceforth stands for all the objects severally and collectively from the analysis of which it sprung, and each object will be referred to under that name, with the prefix of the definite or indefinite article.

The more searching the analysis has been, and in consequence, the greater is the number of common points of resemblance comprised in the term, the fewer number of objects in the universe will that term stand for; and conversely, the more superficial has been the scrutiny of the objects, and the fewer the common features of identity, the greater will be the number of objects that will stand under that term. For example, in reviewing the vegetable world a very superficial glance enables us to discern the circumstance that an immense number of different objects have the common attribute of green. If, however, we descend to the more minute particulars than the colour of foliage, if, for instance, we seize upon such common points of resemblance as roots, trunk, boughs, branches, leaves, and such like, and bring these under a common term, we shall find that the number of objects comprised in it is immeasureably reduced, consisting in fact only of trees and shrubs. In like manner we shall find universally, that the wider the term, the greater the number of objects, and the fewer the number of marks of identity; whereas the narrower the term the fewer the number of objects, and the greater the number of marks of identity. This canon has been called by Sir William Hamilton the cardinal point of logic.

It is evident, then, that we may regard the term, whether summum genus, subaltern genus, species, or infima species, as expressing two things: 1st, The mark or marks of identity in the individuals; 2ndly, The objects or object subsumed under the term.

For example, "body" expresses primary qualities, namely, geometrical solidity, physical solidity, (impenetrability), autantitypy, (absolute incompressibility), mobility and situation, and also secundo-primary and secondary qualities. It likewise stands for all our concepts of objects in severalty which possess these attributes in common.

The following table exhibits the facts already enunciated:

	Name.	Mark.	Object.
Genera	α	A.	*a, b, c, d.*
	β	A. B.	*b, c, d.*
	γ	A. B. C.	*c, d.*
Species	δ	A. B. C. D.	*d.*

Individuals. ϵ, ϵ', ϵ'', &c.

In this table α is the term expressing the summum genus; β and γ are the terms expressing subalterna genera; δ is the term expressing the infima species; ϵ, ϵ', ϵ'', &c. are the terms expressing concepts of the individual real objects which constitute these genera and species: α expresses the mark of identity A, and stands for the logical objects *a*, *b*, *c*, *d*, of which *a* is the lowest in the scale of generalisation, and *d* the highest: β and γ speak for themselves: δ expresses the marks of identity A, B, C, D, and stands for the highest logical object *d*; the individuals ϵ, ϵ', ϵ'', &c. have all the marks of δ, and constitute the complete species *d*, which is indicated by the term δ.

In this table also it will be observed that there is an inverse ratio between the number of marks of identity and the number of logical objects. The greater the number of marks expressed by any term, the less is the number of objects subsumed under it, and *vice versâ*.

The following examples may serve to illustrate the table.

EXAMPLE I.

	Class.	Name.	Marks.	Object.
Ideal.	Summum Genus	Letter	Sign	Letter, Word, Sentence, Book
	1st Subalternum Genus	Word	Sign, Symbol	Word, Sentence, Book
	2d Subalt^{m} Genus	Sentence	Sign, Symbol, Grammar	Sentence, Book
	Species	Book	Sign, Symbol, Grammar, Discourse	Book
Real	Individual	Pilgrim's Progress.		

Example II.

	Class.	Name.	Marks.	Objects.
Ideal	Sum^{m} Genus	Matter.	Primary, Secundo-primary, and Secondary qualities.	Matter, Crystal, Vegetable, Animal, Man
	1st Subalt^{m} Genus	Crystal	do. do. do. + Structure	Crystal, Vegetable, Animal, Man
	2nd Subalt^{m} Genus	Vegetable	do. do. do. do. + Life	Vegetable, Animal, Man
	3rd Subalt^{m} Genus	Animal	do. do. do. do. do. + Sensation	Animal, Man
	Species	Man	do. do. do. do. do. do. + Reason, Consciousness, and Freewill	Man
Real	Individual	John Bunyan.		

Now, to take the case of a single genus and a single species, to begin with, for the sake of simplicity: let X be a genus consisting of divers species of which Y is one. It is evident that either of these may be considered the greater logical whole of the two, that is, we may consider the genus X as comprehending all the individual objects of the species Y, or we may consider these individual objects, and therefore the species Y, as including all the marks of identity of the genus X; in other words, we may at pleasure treat the genus as comprehending the species, or the species as including the genus; in the former case we are said to proceed in the logical whole of *comprehension* (or intension or depth), in the latter we are said to proceed in the metaphysical whole of *extension* (or breadth); to explain which fully we must proceed to that branch of logic which treats of propositions.

PART II.

OF PROPOSITIONS.

For all purposes of logic a proposition may be considered as simple, and as such may be defined to be the expression of our judgment that two notions or concepts do or do not agree.

It accordingly consists of two terms, and a sign of relation *is* or *are*, which is called the Copula. The one notion being affirmed (or denied) of the other, the leading term of which the other is affirmed (or denied) is called the Subject; and the other term so affirmed (or denied) of the subject, is called the Predicate.

Of the subject it is easy to see that if it stand or a class (and not for an individual) we may affirm the predicate of some indefinite part of it, while on the other hand, whether it stand for a class or an individual we may affirm the predicate of all the subject.

The subject then has always a quantity definite or indefinite, and for all purposes of logic this quantity must be distinctly expressed in words, and in such case the subject is said to be quantified.

Thus when we say:

All men are mortal, or,
Some men are cowards;

the words 'All' and 'Some' are signs which express the quantification of the subject 'men.'

Owing to the ambiguities of language it is desirable to have recourse to the expedient of attaching the signs of quantity by means of a hyphen to the terms to which they belong; thus, 'All-men.'

In the previous chapter we have exhibited and explained the various relations of concepts in a system of classification. From what has been there said, it may be readily perceived that when we bring an object under a concept, that is, when we predicate of it that it belongs to such a class, we must know that it occupies a certain place in that class. For if we were uncertain what place the individual object occupied in the class, or whether it occupied any place at all, we should not know the class, and could not therefore bring any object under it.

For example, if I do not know whether 'rose' comes under the concept 'flower,' or whether it is equal to some part or the whole of that concept, or whether it is superior to it, I do not know the class 'flower,' and cannot of course predicate 'flower' of 'rose:' in other words I cannot bring 'rose' under the concept 'flower,' since I do not know what the concept means, what it contains, or what it does not. This is clear; for as we have already explained, since a concept as a factitious unity in thought (a logical whole) is absolutely worthless, and indeed not cognizable, out of relation to the individual objects, the aggregate of whose resembling qualities it constitutes, and since an object is truly known only as it is thought, through or under a concept, it follows that comprehension in such a case would be impossible. If therefore we understand the object at all, we must (by an act of judgment) fix in thought the sphere which it occupies under the class to which in predication we have assigned it. In other words, if we comprehend what we utter, every notion holding the place of predicate in a proposition must have a determinate quantity in thought, and therefore the predicate ought to be quantified in language (BAYNES). Notwithstanding this unquestionable conclusion, the *impropriety* of such quantification has been tacitly assumed or expressly affirmed by the majority, if not the whole, of the logical writers of antiquity whose works are extant. The few who have touched upon the subject seem for the most part to have conceived the *possibility* of its express quantification only universally, as

Omnis homo est *omne* animal.

Yet in point of fact there is nothing in Logic more certain than the propriety of quantifying the predicate; for its quantification must always take place in judgment; and logic, as we have already said, demands as its prerequisite that everything that is contained in thought shall be expressed in language. In affirming the predicate of a subject we simply express the relation of quantity in which a class stands to an individual, or two classes to one another. If this relation were indeterminate, that is, if we were uncertain whether it was a part, or whole, or none, there could be no predication. The very fact of predication is therefore always evidence that the concept constituting the predicate holds a relation of determinate quantity to the subject; in other words, we think only as we think under some determinate quantity, all thought being nothing more nor less than a comparison of part and whole. Or, let us put the argument in another form: all predication is but the utterance of thought: the predicate has a determinate quantity in thought: all predication must therefore have a determinate quantity (BAYNES). It is true that common language generally makes an ellipsis of the quantification of the predicate in the proposition; but it does the like in respect of many other things which are unambiguous in thought, more especially in inference and argumentation, and yet in all such cases the postulate applies, that for all purposes of logic everything that is contained, however implicitly, in thought, shall have a determinate expression in language. We conclude, then, that in all propositions both the subject and the predicate ought to be quantified.

Quantity belongs to terms, not, as some logicians say, to propositions; but it is by an act of judgment that the quantity of any term is determined in respect of any other term. The principal signs of the quantity of a term are 'All' and 'Some.' When the proposition is negative, that is, contradictorily denies a predicate of a subject, the English language necessitates the adoption of the sign 'Any' (or 'No'). Affirmation being as we have said indicated by the copula 'is' or 'are,' negation is indicated by 'Is not' or 'Are not' (or 'No—is'). That attribute of a proposition, which consists in its being an affirmation or negation, is called its Quality. Hence while we speak of the quantity of the terms, we say the quality of the proposition which expresses the relation between those terms.

The following table will shew the different species in the several genera, quantity and quality.

Quantity	Universal	ideal	of a term.
	Particular	ideal	
	Individual	real	
Quality	Affirmative	ideal	of a proposition.
	Negative	ideal	
	Infinite	real	

It will be observed that in each of these genera a third species appears. This is but the form of the co-existence of the other two. Thus the individual is in respect of its species a particular, but it constitutes in itself a universal. Again, a proposition, in denying an indefinitely quantified predicate of a subject, affirms thereof a predicate of indefinite quantity. Thus, if I say, 'the soul is not mortal,' I posit the soul in the complement of 'immortal,' that is, I affirm that 'the soul is some immortal;' and this is called 'an infinite judgment,' because the remainder of the logical universe ('immortals') is unlimited, save by the abstraction of 'all mortals,' and therefore is for all logical purposes considered as infinite. However, the *individual* quantity of a term, and the *infinite* quality of a proposition belong rather to the matter or content of such term and proposition respectively, and, as such are not subjects of which logic can in strictness take cognisance. Though the term *quality* is properly restricted to the affirmative or negative character of propositions, yet we may, without departing from this just restriction, treat in this place of the effect of qualifying the quantity of a term, *i. e.* of regarding it as included or excluded: and first of dichotomy.

Dichotomy is the separation of the logical universe into two parts. We take, for instance, X out of the universe; what is left is Not-X. These two complementary terms are called *contradictory* terms; their peculiar property is that they exclude one another; and that the two together make up or exhaust the universe of thought. They exclude each other, since by including X, we virtually exclude Not-X; and by including Not-X, we virtually exclude X. They exhaust the universe, because whatever is not X, must be Not-X, and whatever is not Not-X must be X.

Now, if after making a dichotomy of the universe, X, Not-X, we seize on a common attribute of a part, and a part only, of the subclass X, and thus dichotomise it into the contradictory parts Y and Not-Y, these last terms are said to be *contrary;* their peculiar property is that they agree in certain marks of the subclass X, but contradictorily differ in certain marks of the higher class Y; and that not only are they mutually exclusive in the class Y, but they are both excluded from the negative side of the first dichotomy, Not-X.

Let us illustrate this by reference to the table at page 10, and take the summum genus *α*. The universe consists of *a*, *b*, *c*, and *d*, and Not-*a*, Not-*b*, Not-*c*, and Not-*d*: now from the *α* extract such individuals as have the marks A, B, C, and D, then all the individuals in *β* are either *b*, *c*, and *d*, or Not-*b*, Not-*c*, and Not-*d*; but these terms do not exhaust the universe: they are *contrary* only, *i.e.* are contradictory in the sub-class *β*, and in that *only.*

Besides the symbols of quantity, All and Some, I shall employ the symbol Certain, by which I mean Some at least, Not-all; their contradictories are Not-all, Not-any, Not-certain. Thus:

Affirmatives.	*Negatives.*
1. All-X. Definite universal inclusion of X.	1. Not-all-X. Indefinite exclusion of X. (Universal or partial.)
2. Some-X. Indefinite inclusion of X. (Universal or partial.)	2. Not-any-X. Definite universal exclusion of X.
3. Certain-X. Partial inclusion of X. (Indefinite or definite.)	3. Not-certain-X. Partial exclusion of X. (Indefinite or definite.)

We proceed now to enumerate in a tabular form all possible affirmative and negative propositions, employing X and Y as representatives of the terms.

Affirmative (assertorial).

1. All-X is All-Y.
2. All-X is Some-Y.
3. Some-X is All-Y.
4. Some-X is Some-Y.

Negative (contradictory).

1. All-X is not All-Y.
2. All-X is not Some-Y.
3. Some-X is not All-Y.
4. Some-X is not Some-Y.

It may be objected that the negative propositions are ambiguously expressed. We reply, without the hyphen between the sign of quantity and the term, the objection would be valid; but with the hyphen we are convinced that no more precise modes of expressing these contradictories are to be found in the language. However, if it be considered desirable, the negative propositions may be expressed as follows.

Negative.

1. Some-X is not Some-Y.
2. Some-X is not Any-Y.
3. Any-X is not Some-Y.
4. Any-X is not Any-Y.

The word 'Some' in all these propositions means 'Not-none, perhaps All;' bearing this in mind it is easy to discern that some of these propositions are comprised in others, according as an indefinite subject or predicate is comprised in a definite subject or predicate: the following table exhibits all these relations.

Affirmatives.	All-X is All-Y	includes	All-X is Some-Y Some-X is All-Y	Affirmatives.
	All-X is Some-Y Some-X is All-Y	include..	..Some-X is Some-Y	
Negatives.	Some-X is not Any-Y Any-X is not Some-Y	include	Some-X is not Some-Y	Negatives.
	Any-X is not Any-Y..	..includes	Some-X is not Any-Y Any-X is not Some-Y	

The above eight propositions are written by Sir William Hamilton as follows:

Affirmatives.

A.F.A. = All– is All–
A.F.I. = All– is Some– (A),
I.F.A. = Some– is All–
I.F.I. = Some– is Some– (I).

Negatives.

A.N.A. = Any– is not Any– (E),
A.N.I. = Any– is not Some–
I.N.A. = Some– is not Any– (O),
I.N.I. = Some– is not Some–.

In this table A signifies definite, and I indefinite. F signifies an affirmative quality, and N a negative quality. For the explanation of (A), (I), (E), (O), the reader is referred to Whately's *Logic*, Book II. ch. 2, § 1.

Of the adequacy of the four negative propositions to express the contradictories of the four affirmative propositions we may entertain a reasonable doubt. For example. Let 'All-X is All-Y' be the affirmative proposition, now what is the proposition which denies this? or in other words, what is its contradictory? The answer is 'All-X is not All-Y.' This is hardly English, but in the absence of a native idiom it must suffice. It means that the whole class X is not co-incident with the whole class Y, and, as all concepts refer to individual objects, it denies that the same individuals constitute both classes. This may happen in these cases only, (1) when there is one individual at least in the class X which is not found in the class Y, or (2) when one individual at least in the class Y is not found in the class X, or (3) when both (1) and (2) are concurrent. Or, to take a concrete example: let our fundamental proposition be, 'All-cloven-footed animals are Some-ruminants.' The contradictory of this is established by the production of a sow which is cloven-footed but not ruminant, or by the production of a hare, which is ruminant but not cloven-footed, or by the production of both. The contradictory therefore may be always expressed under one of the two following forms: 'Some-cloven footed animals are not Any-ruminants,' and 'Some-ruminants are not Any-cloven-footed.' So far all is clear; but the difficulty is in the attempt to express these two propositions in one. The nearest approximation to the exact contradictory expressed in a native idiom is, 'Some-cloven-footed animals are not Some-ruminants;' in using which we must always bear in mind that *one* of the signs of quantity may mean 'Any.'

Accordingly for all purposes of Logic the proposition 'Some-X is not Some-Y,' may be employed as the contradictory of the proposition, 'All-X is All-Y.' By a similar train of reasoning it will readily appear that 'Some-X is not Any-Y' is the contradictory of 'All-X is Some-Y;' also that 'Any-X is not Some-Y,' is the contradictory of 'Some-X is All-Y;' and lastly that 'Any-X is not Any-Y' is the contradictory of 'Some-X is Some-Y.' To verify these assertions, the reader is strongly recommended to examine closely the relations set forth in the table at page 22; and besides the exercise of substituting for the symbolic propositions therein their equivalents derived from nature, (an exercise highly to be commended), the student should experimentalise on the abstract formal propositions, being careful to give 'Some' its possible maximum value of 'All' in affirmative propositions, and of 'Any' in negative propositions.

The advantages accruing from the quantification of the predicate are innumerable. Not the least important of these is the result that all conversion of propositions is *simple*. By the term 'conversion' logicians ordinarily understand a transposition of the terms, and such change of quantity, or even of quality, as is necessary to render the converted proposition the exact equivalent of the original one, *i. e.* so that the former contains neither more nor less than the latter. But with a quantified predicate no such change of quantity or quality is necessary to preserve unchanged the sense of the propositions. In any proposition, where both terms are quantified, conversion is effected by simply transposing the terms with their quantitated adjuncts. Thus:

All-X is All-Y = All-Y is All-X.
All-X is Some-Y = Some-Y is All-X.
Some-X is All-Y = All-Y is Some-X.
Some-X is Some-Y = Some-Y is Some-X.

The student may readily satisfy himself of the fact that these observations are applicable to the four negative propositions.

In fact the effect of quantifying the predicate is the annihilation of all essential distinction between subject and predicate, so that either term in a proposition may be made (by conversion, if necessary) that of which the other is predicated. Let us investigate this result more closely. Take the proposition 'X is Y,' in which no quantities appear. What does this mean? In extension it signifies 'X is contained under Y;' in intension it signifies 'X comprehends in it Y.' In the former case we mean that Y is the larger logical whole, and that X is subsumed under it. In the latter case we mean that X is the greater metaphysical whole, and that Y is subordinated to it. In the proposition, then, 'X is Y,' in whichever whole we proceed, X is the subject and Y the predicate. Now let us quantify both terms and it will appear that there is no longer any necessity for interpreting the copula differently, according to the whole in which we proceed, but that the copula becomes a mere sign of identity. Thus we say, 'All-X is Some-Y,' or 'Some-Y is All-X,' and similarly, 'Some-X is All-Y,' or 'All-Y is Some-X,' and the essential distinction between subject and predicate is no more. Similar remarks apply of course with as much force to negative propositions.

The following are examples of the above eight propositions, I. necessary, II. contingent.

I. *Necessary Propositions.*

(These are all derived from pure science.)

Affirmatives.

1. All-parallel lines are All-non-intersecting lines.
2. All-radii of a circle are Some-equal straight lines.
3. Some-parallels are All-circles having a common centre.
4. Some-square numbers are Some-even numbers.

Negatives.

1. All-odd numbers are not All-cubes.
2. All-quadrilaterals are not Some-squares.

3. Some-odd numbers are not All-multiples of an odd number.

4. Some-radii of a plain spiral are not Some-equal radii.

II. *Contingent Propositions.*

(These are all derived from experience.)

Affirmatives.

1. All-vertebrate animals are All-fishes-reptiles-birds-mammals and men.
2. All-fishes are Some-cold blooded.
3. Some-flying vertebrates are All-birds.
4. Some-fishes are Some-vertebrates that intromit in fecundation.

Negatives.

1. All-animals that intromit in fecundation are not All-cold-blooded vertebrates.
2. All-fishes have not Some-eyelids.
3. Some Silurian and Devonian animals are not All-vertebrates.
4. Some-reptiles are not Some-animals having dorsal parapophyses.

Affirmatives.

1. All-birds are All-vertebrates having the lungs fixed in the interstices of the ribs.
2. All-reptiles are Some-vertebrates having two auricles and one ventricle to the heart.

3. Some-vertebrates having the nasal canal communicating with the mouth are All-reptiles.
4. Some-cold blooded are Some-vertebrates that lack the outward sign of the organ of hearing.

Negatives.

1. All-mammals are not All-flying vertebrates.
2. All-vertebrates having cochlea to the labyrinth are not Some-fishes.
3. Some-Silurian and Devonian are not All-fishes.
4. Some-reptiles are not Some-vertebrates having the scapular arch articulated to the occiput.

Affirmation. ↓

Line of Breadth. (Extension).

Line of Depth. (Intension)

Summum Genus.	A	A	A	A	A	A	A	A
1st Subaltern Genus.	A'	A'	A'	A'	A'	A'	A'	
2nd Subaltern Genus.	A''	A''	A''	A''	A''	A''		
3rd Subaltern Genus.	A'''	A'''	A'''	A'''	A'''			
4th Subaltern Genus.	A^{iv}	A^{iv}	A^{iv}	A^{iv}				
5th Subaltern Genus.	A^{v}	A^{v}	A^{v}					
6th Subaltern Genus.	A^{vi}	A^{vi}						
Species.	A^{vii}							
Individuals.	$a, a, a \ldots\ldots a', a', a' \ldots\ldots a'', a'', a'' \ldots\ldots$ &c. $a^{vii}, a^{vii}, a^{vii} \ldots\ldots$							

Line of Dichotomy.

Negation. ↑

Ideal.

Real.

A, A, &c.... are groups of individuals (a, a, a &c....) having the generic mark A.
A', A', &c.... are groups of other individuals (a', a', a' &c....) having the generic mark A'.
&c. &c. &c.
A^{vii}, A^{vii}, &c...are groups of other individuals (a^{vii}, a^{vii} a^{vii}, &c...) having the specific mark A^{vii}.

In the process of generalisation, we begin with the real individual objects. Logically regarded, they are severally indivisible: we cannot affirm of a, that 'Some-a is not Some-a,' or of a', that 'Some-a' is not Some-a'' &c. We select from among those individuals a^{vii}, a^{vii}, a^{vii}, &c., being all that have the mark of (infima) species A^{vii}: we accordingly sublimate that group into the place of species. We now select from among the marks of the A^{vii}, that mark which is next shallower (and therefore wider) than A^{vii}, viz. A^{vi}, and we accordingly sublimate the same group again, viz. to 6th subaltern genus: but there are other individuals, a^{vi}, a^{vi}, a^{vi}, &c. which, though not possessing so deep a mark A^{vii}, have the shallower mark A^{vi}; and all such individuals we group under that name, and sublimate at once to 6th subaltern genus (vide 2nd column). We now select from among the various attributes of the two groups A^{vii}, and A^{vi}, the next shallower (and therefore wider) attribute than A^{vi}, viz. A^{v}, and these two groups we accordingly sublimate to 5th subaltern genus: but there are other individuals, a^{v}, a^{v}, a^{v}, &c. which, though lacking the deeper marks A^{vi} and A^{vii}, possess the shallower mark A^{v}. These we group, and sublimate at once to the 5th subaltern genus (vide 3rd column); and so on, until all our groups are found in the summum genus; and, as a finishing stroke, all the individuals a, a, a, &c. which lack the marks A^{vii}, A^{vi}, A^{v}, A^{iv}, A''', A'', and A', but possess the attribute A, (the shallowest and broadest of all) are *per saltum* sublimated from the region of reality to the *summum genus.*

In employing this table it must be borne in mind that all propositions can be read in either whole, without changing the sign of quantity. Thus All-A″ is Some-A′, may be read either, all A″ contains in it (as attribute) some A′, (depth); or, all A″ contains under it (as constituent) some A′, (breadth).

Terms have the same extension, or are co-extensive, when they stand for the same objects. Thus *man*, *rational*, are co-extensive, because, (speaking of course with sole reference to beings of this world,) every man is rational, and every rational is a man, that is, the same objects are *denoted* by both terms.

Terms have the same intension, or are co-intensive when they stand for the same marks. Thus, *rood*, *acre*, are co-intensive, because every mark (except that of the extension) possessed by a *rood* is likewise possessed by an *acre*, and *vice versâ*; that is, the same marks are *connoted* by both terms. 'All-man is All-rational,' is the co-extensive relation between terms that are not co-intensive. 'All-rood is Some-acre' is the non-co-extensive relation between terms that are co-intensive. Terms have equal extension, or are equi-extensive when the objects denoted by each are equally extensive.

Thus:

Justices of the court of Queen's Bench, 1750, and

Justices of the court of Queen's Bench, 1850, are terms which are co-extensive; though, in point of fact, some only of the former are some only of the latter. Terms have equivalent intension, or are equi-intensive when the marks connoted by each are of equivalent degrees of generalisation. Thus, *triangular*, *trilateral*, are terms which agree in connoting triplicity, but the one connotes angularity, and the other laterality, and angles and sides are of equivalent degrees of generalisation, viz. geometrical-of-two-dimensions.

In the first of the last two examples the terms are co-intensive, as well as equi-extensive; and in the second, the terms are co-extensive, as well as equi-extensive. We might have chosen differently. Thus, for the first, we might have chosen the relation between *hours on the dial*, and *a jury*, (no hours on the dial are any of a jury). And for the second, we might have chosen *equilateral* and *equiangular* which are not co-extensive, since for instance, an equilateral parallelogram (not a square) is not equiangular.

Now what is the bearing of these remarks on the last table? Carry the eye down the first *file* (or column). The groups A, A′, A″, &c.... $A^{v''}$, are composed of exactly the same individuals $a^{v''}$, $a^{v''}$, $a^{v''}$, &c. They are merely sublimated, from the species *gradatim* to the summum genus, according to the attributes they possess. Accordingly we say, that no two of the groups, A, A′, A″, &c... $A^{v''}$, are co-intensive, but they are all co-extensive. Again, carry the eye along the first *rank* (or row). The groups, A, A, A, &c. have precisely the same mark or marks, A; but they do not contain the same set of individuals among the *a*, *a*, ... *a'*, *a'*, ... *a''*, *a''*, ... &c. Accordingly we say, that all the groups A, A, A, &c. are co-intensive, but no two of them are co-extensive.

Similar remarks apply of course to all the files and all the ranks.

For all the table says to the contrary, however, any two or more of the groups in one file *may be* equi-intensive; and any two or more of the groups in one rank *may be* equi-extensive.

Now if we introduce the new quantity *certain*, indicating partial (definite or indefinite) inclusion, or partial (definite or indefinite) exclusion, of the term to which it is prefixed, we shall have to add ten propositions to the foregoing eight, which are all as important in a logical point of view as those eight, simply because they validly express actual judgments. These ten are as follows:

Affirmative.	*Negative.*
All-X is Certain-Y.	All-X is not Certain-Y.
Certain-X is All-Y.	Certain-X is not All-Y.
Certain-X is Certain-Y.	Certain-X is not Certain-Y.
Some-X is Certain-Y.	Any-X is not Certain-Y.
Certain-X is Some-Y.	Certain-X is not Any-Y.

Certain here means, Some at least, Not-all: it indicates a partial quantification, whether definite or indefinite. Its value may be known or unknown: it may, if you please, be numerically exprimable. The propositions, 'Certain-X is Certain-Y,' and 'Certain-X is not Certain-Y,' where 'Certain' is a definite quantity, are called *numerically definite propositions.*

We now proceed to state, according to Sir William Hamilton's masterly analysis, the result and process of affirmation and negation, and to contrast the two qualities according to the wholes in which they proceed. In *result* affirmation is *inclusion*, and universal affirmation is absolute inclusion, that is, the inclusion of a definite *this* or *all* (individual or class). Negation is *exclusion,* and universal negation is absolute exclusion, that is, the exclusion of a definite *this* or *all* (individual or class). In *process* affirmation proceeds downwards or inwards, from greatest to least, from the constituted whole to the constituent parts. Negation proceeds upwards or outwards, from least to greatest, from the constituent parts to the constituted whole. In *contrast,* in proportion to the intension is affirmation, in proportion to the extension is negation. At the maximum of extension there are predicated by affirmation least of the most; that is, there are given the fewest attributes to the greatest number of things: by negation, there are given the most of the least, that is, there are withdrawn the greatest number of attributes from the fewest things. At the maximum of intension there are predicated by affirmation the most of the least, that is, there are given the greatest number of attributes to the fewest things: by negation, there are given the least of the most; that is, there are withdrawn the fewest attributes from the greatest number of things. Hence in breadth, to posit the genus is not to posit the species or the individual; but to sublate the genus is to sublate the species and the individual: also in depth, to posit the individual is to posit the species and the genus; but to sublate the individual is not to sublate the species or the genus.

In the foregoing exposition there is one point which demands elucidation. The direction in which affirmation and negation proceed may be discerned from the following considerations. Having regard to the table at page 29, and reading it in breadth (or extension), an individual or class contained in any superior class, say the sixth subaltern genus, is necessarily included in every higher genus, but is not necessarily included in any lower class. In order then to include it in such lower class we must make an affirmation in which such class stands as predicate, that is, we proceed downwards. Similarly, if an individual or term be not contained in the sixth subaltern genus, it is necessarily excluded from every inferior class, but not necessarily excluded from any superior class. Accordingly if we wish to exclude it from such class we must make a negation in which such class stands as predicate, that is, we proceed upwards. If the table be read in breadth, the individual is greater than any class, while the summum genus is the least class: so that if in any affirmation or negation, the signs of quantity be made to stand (improperly no doubt) for the intension of the terms to which they may be prefixed, affirmation would proceed upwards and negation downwards. But as we have already seen (page 28), terms are only expressly quantified with reference to the logical whole of extension. Affirmation, therefore, is always downwards and negation upwards. The former proceeds inwards towards the most intensive class, the latter outwards to the most extensive class.

When in a proposition the quantity of both terms is definite (whether universal or particular), the judgment expressed thereby is called a definition of the most implicit of the two terms. Definition may be of three kinds. 1. By the intension of the defined concept. 2. By its extension. 3. By accidental coincidence. Examples: of 1. Man is a being endowed with reason, consciousness, free-will, and understanding: of 2. Britons are those that dwell in England, Scotland, or Wales: of 3. A triangle is a figure contained by three straight lines.

Having now treated of the Quantity of a Term and the Quality of a Proposition, we proceed to consider the Relation of Propositions. Relation is properly predicated of a plurality of propositions only. It is of three kinds, as follows:

Relation { Independent / Conjunctive / Disjunctive } of propositions.

Independent propositions are of the following forms:

X is Y and X is Z (or Z is X).
X is Y and Y is Z (or Z is Y).
X is Y and Z is W (or W is Z).

In any of these forms, the propositions in each pair (though in two instances internally connected), are categorically independent.

Conjunctive propositions are of the following forms:

If X is Y X is Z (or Z is X).
If X is Y Y is Z (or Z is Y).
If X is Y Z is W (or W is Z).

In all these forms, the latter proposition is consequentially dependent on the former.

Disjunctive propositions are of the following forms:

Either X is Y or X is Z (or Z is X).
Either X is Y or Y is Z (or Z is Y).
Either X is Y or Z is W (or W is Z).

In each of these forms the propositions are consequentially exclusive of each other.

PART III.

OF ILLATION.

We restrict the term Illation to that kind of inference which is direct and immediate, and we confine the term Syllogism to that kind of inference which is indirect and mediate. When, from the consideration of one or more propositions, involving only two terms, we are enabled to arrive at a judgment not *formally* identical with the judgments expressed in such proposition or propositions, the process of arriving at the second judgment is called immediate inference or Illation.

Illation by Opposition.

The simplest instance of this, (excluding Conversion, which, when the predicate is quantified, is no inference at all), are the inferences depending on logical Opposition. Two propositions are said to be in opposition, when the terms of each are the same while the one proposition is affirmative and the other negative. Accordingly it follows that when any one of the following propositions, viz.:

1.	All-X is All-Y	Affirmative,
2.	All-X is Some-Y	
3.	Some-X is All-Y	
4.	Some-X is Some-Y	

is asserted simultaneously with any one of the following, viz.:

5.	Some-X is not Some-Y	Negative,
6.	Some-X is not Any-Y	
7.	Some-Y is not Any-X	
8.	Any-X is not Any-Y	

the two are in opposition.

The following are all the pairs that can be formed by taking one proposition from the affirmatives, and one from the negatives.

1+8. 1+7. 1+6. 1+5. 2+8. 2+7. 2+6. 2+5.
3+8. 3+7. 3+6. 3+5. 4+8. 4+7. 4+6. 4+5,
sixteen in all.

Those pairs that exclusively contradict each other are (as we have already seen) called Contradictories, the one proposition denying exactly that which the other affirms. In Contradictories moreover, there are always two terms indefinite, and two definite. Those propositions in any pair which are inconsistent with each other, without necessarily excluding each other, are called Contraries. Those propositions in any pair which are consistent with each other, but whose Contradictories are Contraries, are called Subcontraries.

Those propositions in any pair, which may be simultaneously either inconsistent or consistent, are called Subalterns. The remaining combinations of propositions, two and two, viz. those in which there is no difference of quality, both propositions being affirmative or both negative, are not cases of opposition at all. They will be treated of under another head. (Illations by Fluxion.)

The cases of opposition above enumerated, viz. four Contradictories, five Contraries, five Subcontraries, and two Subalterns, (that is, sixteen in all,) appear in detail in the following tables. In all such pairs, Some of course means Some at least, perhaps All. However, in investigating the conditions of their solution, we replace every 'Some' by *Certain*.

I. *Exclusives* (or *Contradictories*).

{All-X is All-Y {Some-X is not Some-Y {All-X is Some-Y {Some-X is not Any-Y {Some-X is All-Y {Some-Y is not Any-X {Some-X is Some-Y {Any-X is not Any-Y	In each pair, the propositions cannot both be true at once, or both false at once. One of the two must be true, and the other false.

II. *Inconsistents* (or *Contraries*).

<table>
<tr><td>All-X is All-Y
Any-X is not Any-Y</td><td rowspan="5">In each pair, the propositions may both be false at once, but they cannot both be true at once.</td></tr>
<tr><td>All-X is All-Y
Some-X is not Any-Y</td></tr>
<tr><td>All-X is All-Y
Some-Y is not Any-X</td></tr>
<tr><td>All-X is Some-Y
Any-X is not Any-Y</td></tr>
<tr><td>Some-X is All-Y
Any-X is not Any-Y</td></tr>
</table>

III. *Consistents* (or *Subcontraries*).

<table>
<tr><td>Some-X is Some-Y
Some-X is not Some-Y</td><td rowspan="5">In each pair, the propositions may both be true at once, but they cannot both be false at once.</td></tr>
<tr><td>All-X is Some-Y
Some-X is not Some-Y</td></tr>
<tr><td>Some-X is All-Y
Some-X is not Some-Y</td></tr>
<tr><td>Some-X is Some-Y
Some-X is not Any-Y</td></tr>
<tr><td>Some-X is some-Y
Some-Y is not Any-X</td></tr>
</table>

IV. *Subalterns.*

{ All-X is Some-Y { Some-Y is not Any-X { Some-X is All-Y { Some-X is not Any-Y	In each pair, both propositions may be true at once; or both may be false at once.

These tables may be greatly simplified. It is observable that in the table of Contraries, the propositions of each pair are the Contradictories of those in a corresponding pair in the table of Subcontraries. Thus:

Contraries.	*Subcontraries.*
All-X is All-Y. Any-X is not Any-Y.	Some-X is not Some-Y. Some-X is Some-Y.
All-X is All-Y. Some-X is not Any-Y.	Some-X is not Some-Y. All-X is Some-Y.
All-X is All-Y. Some-Y is not Any-X.	Some-X is not Some-Y. Some-X is All-Y.
All-X is Some-Y. Any-X is not Any-Y.	Some-X is not Any-Y. Some-X is Some-Y.
Some-X is All-Y. Any-X is not Any-Y.	Some-Y is not Any-X. Some-X is Some-Y.

Similarly, the propositions in either of the two pairs of Subalterns, are the Contradictories of those, each to each, in the other. Thus:

All-X is Some-Y. Some-Y is not Any-X.	Some-X is not Any-Y. Some-X is All-Y.

I. *Contradictories.*

There is no condition of solubility of a pair of Contradictories, inasmuch as the propositions so opposed cannot be simultaneously true.

II. and III. *Contraries and Subcontraries.*

If the propositions in any pair of Contraries be false, those in its corresponding pair of Subcontraries are true. We may therefore confine our attention to the pairs of subcontraries:

1.

Some-X is not Some-Y,
Some-X is Some-Y.

Certain-X is not Certain-Y } is the resulting illation.

2.

Some-X is not Some-Y,
All-X is Some-Y.

Some-X is not Certain-Y
and, All-X is Certain-Y } are the resulting illations.

3.

Some-Y is not Any-X,
Some-X is Some-Y.

Certain-Y is not Any-X
and, Some-X is Certain-Y } are the resulting illations.

4.

Some-X is not Some-Y,
Some-X is All-Y.

Certain-X is not Some-Y } are the resulting
and, Certain-X is All-Y } illations.

5.

Some-X is not Any-Y,
Some-X is Some-Y.

Certain-X is not Any-Y } are the resulting
and, Certain-X is Some-Y } illations.

I append a couple of examples.

Some-civilian is not Some-military.
Some-civilian is Some-military.

Therefore, if certain members of parliament be the civilians who constitute a portion of the military, the class civilian is divisible into military M.P.'s and not-military, and the class military is divisible into military M.P.'s and not-civilian.

Again,

All-human is Some-biped.
Some-biped is not Any-human.

Therefore, if birds be the bipeds who are not human, the class biped is divisible into birds and men, and the other bipeds, if any.

IV. *Subalterns.*

Let	All-X is Some-Y	be simultaneous-
and	Some-Y is not Any-X	ly true.
	All-X is Certain-Y	are the resulting
and,	Certain-Y is not Any-X	illations.

and if	Some-X is All-Y	be simultaneous-
and	Some-X is not Any-Y	ly. true.
	Certain-X is All-Y	are the resulting
and,	Certain-X is not Any-Y	illations.

In all these cases Certain implies *definite* quantity.

These solutions are of more importance in applied logic than their form would lead us to suppose.

In concluding our remarks on these instances of immediate inference, we may call attention to the fact, that in every case in which an inference is drawn *immediately* from two propositions, we have only to lay down the illative result as the original proposition, and the two opposed propositions will form a double immediate inference therefrom.

We now proceed to consider

Illation by Privation.

The following Table will exhibit all possible assertorial inferences from the eight general propositions, by writing for one or both terms its contradictory (or infinite complement),

1. All-X is All-Y.

Therefore, { Any-X is not Any-not-Y,
Any-not-X is not Any-Y,
All-not-X is All-not-Y. }

Example to 1. 'The just are all the holy.' 'No just man is unholy.' 'No holy man is unjust.' 'All unjust men are all the unholy.'

2. All-X is Some-Y.

Therefore, { Any-X is not Any-not-Y,
Any-not-X is not Some-Y,
Some-not-X is All-not-Y. }

Example to 2. 'All the righteous are happy.' 'None of the righteous are unhappy.' 'Some happy men are not unrighteous.' 'All who are not happy are not righteous.'

3. Some-X is All-Y.

Therefore, { Some-X is not Any-not-Y,
Any-not-X is not Any-Y,
All-not-X is Some-not-Y.

Example to 3. 'Some happy persons are all the righteous.' 'Some-happy persons are not unrighteous.' 'No unhappy person is righteous.' 'All who are unrighteous are unhappy.'

4. Some-X is Some-Y.

Therefore, { Some-X is not Any-not-Y,
Any-not-X is not Some-Y.

Example to 4. 'Some desirable events are probable.' 'Some desirable events are not improbable.' 'Some probable events are not undesirable.'

These are all the immediate (assertorial) inferences by privation that can be drawn from affirmative propositions.

It will be observed that each proposition except the fourth affords three inferences and no more. When we proceed however to negative propositions, the circumstances are very different.

No negative proposition can yield more than two assertorial illations, and one negative proposition affords none at all.

5. Some-X is not Some-Y.

On this proposition no categorical immediate inference by privation can be drawn.

6. Some-X is not Any-Y.

Therefore, { Some-X is Some-not-Y,
Any-not-X is not Some-not-Y.

Examples of 6. 'Some possible cases are not probable.' 'Some possible cases are improbable.' 'Some improbable cases are not impossible.'

7. Any-X is not Some-Y.

Therefore, { Some-not-X is Some-Y,
Some-not-X is not Any-not-Y.

Examples of 7. 'No probable case is some-possible.' 'Some impossible cases are some possible.' 'Some improbable cases are not impossible.'

8. Any-X is not Any-Y.

Therefore, {
All-X is Some-not-Y,
Some-not-X is All-Y,
Certain (indefinite)-not-X is not Any-not-Y,
Any-not-X is not Certain (indefinite)-not-X.
}

Examples of 8. 'No human virtue is perfect.' 'All human virtues are imperfect.' 'All perfect virtues are unhuman.' 'Certain unhuman virtues are not imperfect.' 'Certain imperfect virtues are not unhuman.'

Besides assertorial inferences of this nature, there are copious hypothetical inferences, namely, conjunctive, disjunctive, and both together. One example of this large family of illatives will suffice.

Take the proposition Any-X is not Any-Y: it is susceptible of the following conjunctive inference: 'If both the propositions, All-not-X is All-Y, and All-X is All-not-Y be untrue, then Some-not-X is Some-not-Y.'

It is evident that instances of this kind of illation might be multiplied *ad infinitum*. We proceed then to

Illation by Fluxion.

By this we mean to speak of immediate inferences derivable from the above eight propositions, by supposing a quantity to shrink or swell, that is, decrease or increase towards the limits zero and infinity, or towards the limits individual and universal.

The reader is referred to the table at p. 22, from which the following statements may be verified:

1. All-X is All-Y.

Therefore, { All-X is Some-Y,
Some-X is All-Y,
Some-X is Some-Y. }

2. All-X is Some-Y.

Therefore, Some-X is Some-Y.

3. Some-X is All-Y.

Therefore, Some-X is Some-Y.

4. Some-X is not Any-Y.

Therefore, Some-X is not Some-Y.

5. Any-X is not Some-Y.

Therefore, Some-X is not Some-Y.

6. Any-X is not Any-Y.

Therefore, { Some-X is not Any-Y,
Any-X is not Some-Y.
Some-X is not Some-Y. }

These are all fluxional inferences by descent from the inclusion or exclusion of a greater quantity to that of a less.

The following are examples of complex fluxional illation:

{All-X is Some-Y, and
{Some-X is All-Y;

therefore, All-X is All-Y.

Again,

{Some-X is not Any-Y, and
{Any-X is not Some-Y:

therefore, Some-X is not Some-Y.

Numerous examples might be given from the same table of hypothetical illation. Thus, from the proposition

All-X is not All-Y,

we have the disjunctive inference

either, Some-X is not Any-Y,
or, Any-X is not Some-Y,

and the conjunctive inferences

if Some-X is Certain-Y,
then Any-X is not Some-Y, and also
if Certain-X is Some-Y,
then Some-X is not Any-Y.

Instances of this kind may be multiplied to a great extent. Their amplification will be good practice for the student.

There is yet another class of fluxional illations.

The ordinary 'hypothetical syllogism,' as it is improperly called, is, as Sir William Hamilton observes, no syllogism at all, but merely an immediate inference. It is either conjunctive or disjunctive. The conjunctive illation is of this kind.

If W is X, Y is Z.
But W is X.
Therefore, Y is Z.

There are however many other forms of this illation.

The disjunctive illation is of this kind.

W is either X, Y, or Z.
But W is not X or Y.
Therefore W is Z:

with many other forms.

That these illations are nothing more than immediate inferences is readily seen by transforming them thus.

Let W, X be U, and Y, Z be V.

Then the conjunctive illation becomes

All-U is Some-V.
Some-U is Some-V,

which is an illation by fluxion.

Again, let us resolve the disjunctive premise,

W is either X, Y, or Z, into its constituent propositions; these are:

{If W is X it is not Y or Z.
{If W is Y or Z it is not X.

{If W is Y it is not X or Z.
{If W is X or Z it is not Y.

{If W is Z it is not X or Y.
{If W is X or Y it is not Z.

The first pair means,

All cases of W is X, is all cases of W is not Y, and W is not Z.

The second pair means,

All cases of W is Y, is all cases of W is not X, and W is not Z.

The third pair means,

All cases of W is Z, is all cases of W is not X, and W is not Y.

Now let W, X be U, W, Y be V, and W, Z be Ω.

Then we have

All-U is All-not-$(V + \Omega)$.
All-V is All-not-$(U + \Omega)$.
All-Ω is All-not-$(U + V)$,

which are three equivalent forms of the same expressions, the illation being by privation.

Any one, then, may stand as sumption in the disjunctive illation.

Let All-Ω is All-not-$(U + V)$ be the sumption.

Then Some-Ω is Some-not-$(U + V)$ is an illation by fluxion.

Logicians reckon many other kinds of immediate inference besides those we have mentioned; all of them however are questionable.

Immediate inferences, to which we deny the name of syllogisms, have been called by Kant, 'Syllogisms of the Understanding.'

It must be carefully borne in mind that though an immediate inference from a given proposition may immensely facilitate the process of reasoning, yet that the neglect to do so will never reduce the constituent parts of a system of ratiocination to enthymemes or sorites. (For the meaning of these words see Whately, Bk. II. c. 4, § 7.)

PART IV.

OF THE SYLLOGISM.

The term Syllogism is here restricted to mean the expression of an argument in which it is necessary to compare two terms with a third term, in order to determine the relation between those two terms. This kind of inference is said to be mediate, and the third term with which the other two are compared is called the Middle Term. Thus, if it be suspected that bitter beer is deleterious, we should be unable to convert that suspicion into a certainty, until we had found that it contains strychnine or some other determined deleterious drug. This argument, which all men go through every day of their lives, is logically expressed as follows: 'Bitter beer contains strychnine; every liquid that contains strychnine is deleterious; therefore bitter beer is deleterious.'

In all such arguments it is evident that there must be two propositions which (whatever other points of similarity or dissimilarity they may have) agree in this, that they both involve the middle term: and disagree in this, that they connect the middle term with different terms. The general canon of mediate inference is this:

The agreement or disagreement of one concept with another is ascertained by a third concept, inasmuch as this wholly or in part agrees with both, or with only one, of the concepts to be compared.

The syllogism may accordingly be defined to be a formula of comparison of any two concepts with, or through the medium of, a third, in order to ascertain whether they agree or not.

Every syllogism therefore consists of three propositions involving the three terms. Divers names have been employed by logicians to particularize these propositions and terms. The following names appear to deserve the preference. The most extensive or most comprehensive of the two propositions, from which the third is inferred, we call the Sumption. The other of those two we call the Subsumption. The sumption and subsumption we call the Premises, and the resulting proposition we call the Consequence. The term that is common to the premises (which in most ancient writers is called the Argument) we have called the middle term, in acquiescence with modern usage. The term involved in the sumption, besides the middle term, we call the Major Term; and the term involved in the subsumption, besides the middle term, we call the Minor Term. Example. 'All men are mortal; Gabriel was not mortal; therefore Gabriel was not a man.' Here 'man' is the major term; 'Gabriel' the minor term. They are compared through the medium of 'mortal,' which is therefore the middle term. 'All men are mortal' is the most extensive premise; and as the syllogism is in the logical whole of extension, this is the sumption, and 'Gabriel is not mortal' is the subsumption. 'Gabriel is not a man' is the 'consequence.'

Not only must every syllogism, as we have said, contain three terms and no more, and three propositions and no more, but of the premises one at least must be affirmative. Moreover the consequence must express the *worst* relation of the two terms with the middle term. If one of the premises be negative, the consequence must also be negative. The comparison of each of the two terms must be with either the whole or some part of the middle term. Neither term must be distributed in the consequence (that is universally affirmed or denied) unless it has been so in the premise involving it. All these conditions are involved in the above canon. (For the copious illustration of all these points the student is referred to Thomson's *Laws of Thought* (1854), § 93.)

The necessity of quantifying the predicates of the sumption, the subsumption, and the consequence of a syllogism, may be easily shewn. For since the syllogism is but a means of stating the agreement or disagreement of two terms by means of their agreement or disagreement with a third, it is imperative that the extent of these terms themselves should be taken into account. Apart from this there can be no measurement of extent and no conclusion of identity or difference of extent as the result of such measurement; and therefore no conclusion of scientific significance. The *implicit* quantification of the predicate has accordingly been always held by logicians, though they have, with well nigh one consent, most illogically rejected its explicit quantification. As there is still some hesitation on their part to allow the claims of the new doctrine in reference to the syllogism, I will enter into a more detailed demonstration of its truth.

In any syllogism the process of the reasoning and the evidence of its validity is the same, and it is the following: the middle term is the mean or measure; in the first place one extreme is compared with the middle term, and seen to agree with it *so far;* then the other extreme is compared with the middle, and also seen to agree with it *so far;* and thereupon this identity of agreement is affirmed. But in either case, if I do not know the extent of the term compared, (cannot take it, that is, in some *definite* extent,) I cannot tell how far it agrees with the middle. Or, again, if I do not know the extent of the middle term, (cannot take it in some definite extent,) I cannot tell whether the term to be compared agrees with it in extent or not,—whether it is part, or whole, or none. The predicate notion, however, in every reasoning, is one of these terms, and stands in one of these relations. It is, therefore, absolutely necessary, as we have said, to the validity of the reasoning that the predicate should always be quantified. (BAYNES).

The incidents of the syllogism are

1. Subordination of propositions.
2. Figure.
3. Mood.
4. Action (or Motion).

1. The syllogism may be deductive or inductive; but until further notice, when we speak of the syllogism, we mean the deductive syllogism.

In the syllogism then the sumption must stand first, and the subsumption must occupy the subordinate place. This distinction however may be lost sight of in dealing with the empty formulæ of the syllogism, where, in point of fact, any proposition may stand as sumption. The form in which a proposition appears in the syllogism is of more importance than the order of the propositions. The English language generally requires that the second term in any affirmative proposition in extension should be more extensive than the first. But even this distinction may for the present be lost sight of; and we may assume that any proposition and its converse are equally admissible in the syllogism.

2. The Figure of a syllogism depends solely on the relative position of the middle term.

The figures are three in number. In the first figure the middle term is the subject of the sumption, and the predicate of the subsumption. In the second figure the middle term stands as predicate in both premises. In the third figure the middle term stands as subject in both premises.

Galen, on insufficient authority, has had the credit or discredit of adding to these a fourth figure, which, through the lack of independence in logical speculation, held an unquestioned place in modern treatises on logic, until its claims were disputed and finally overthrown by Sir William Hamilton. In this supposititious figure the middle term was said to be the predicate of the sumption, and the subject of the subsumption.

The real fact is, that when a syllogism appears in this spurious figure, one has simply to transpose the order of the premises to reduce the syllogism to the first figure; and it is somewhat remarkable, (though perhaps never before remarked,) that if in the premises and consequence the more extensive term occupy the place of predicate, there can be only one syllogism appearing in the fourth figure that is not reducible to the first figure; namely, the following:

{ Any-Y is not Any-X.
{ All-Y is Some-Z.

Therefore Some-Z is not Any-X.

This of course is in the third figure; but it will be also observed that the syllogism is redundant in the subsumption, and that the same consequence would follow if the subsumption were 'Some-Z is Some-Y.' If this proposition stand as subsumption in the above syllogism, the argument is already in the first figure!

Each figure has its own peculiar canon.

Canon of first figure. In so far as two concepts are related, either both positively, or one positively and the other negatively to a common term, of which the one is subject and the other predicate, so far are these two concepts related positively or negatively to each other as subject and predicate.

Canon of second figure. In so far as two concepts (both subjects) are either both positively or the one positively and the other negatively related to a common predicate, so far are they either positively or negatively indifferently subject and predicate of each other.

Canon of third figure. In so far as two concepts (both predicates) are either both positively or the one positively and the other negatively related to a common subject, in so far are they positively or negatively indifferently subject and predicate of each other.

3. The Mood of a syllogism is determined by the quantity of the two terms and the quality of the two propositions which stand as sumption and subsumption.

The moods of each figure are thirty-six in number, of which twelve have positive consequences (and of these twelve, seven are redundant) and twenty-four have negative consequences (of which twenty-four, twelve are redundant).

The moods of the first figure may be exhibited in the following tables, which are the result of combining the four propositions:

<table>
<tr><td>All-Y is All-X
All-Y is Some-X
Some-Y is All-X
Some-Y is Some-X</td><td>with</td><td>All-Z is All-Y
All-Z is Some-Y
Some-Z is All-Y
Some-Z is Some-Y
Some-Z is not Some-Y
Some-Z is not Any-Y
Any-Z is not Some-Y
Any-Z is not Any-Y</td><td>always taking one out of each class and drawing the consequence.</td></tr>
</table>

And also of combining the eight propositions:

<table>
<tr><td>All-Y is All-X
All-Y is Some-X
Some-Y is All-X
Some-Y is Some-X
Some-Y is not Some-X
Some-Y is not Any-X
Any-Y is not Some-X
Any-Y is not Any-X</td><td>with</td><td>All-Z is All-Y
All-Z is Some-Y
Some-Z is All-Y
Some-Z is Some-Y</td><td>always taking one from each class and drawing the consequence.</td></tr>
</table>

By this procedure it will be observed that we elicit every possible combination of YX, and ZY, preserving the condition that both propositions shall not be negative.

Complete Table of Moods in Fig. 1,
(valid and sufficient).

All-Y is All-X
All-Z is All-Y
―――――――
All-Z is All-X

All-Y	is	Some-X		Some-Y	is	All-X
All-Z	is	Some-Y	$\propto$	Some-Z	is	All-Y
All-Z	is	Some-X		Some-Z	is	All-X

All-Y	is	Some-X		Some-Y	is	Some-X
Some-Z	is	Some-Y	$\propto$	Some-Z	is	All-Y
Some-Z	is	Some-X		Some-Z	is	Some-X

Any-Y	is not	Any-X		Some-Y	is	All-X
All-Z	is	Some-Y	$\propto$	Any-Z	is not	Any-Y
Any-Z	is not	Any-X		Any-Z	is not	Any-X

All-Y	is	Some-X		Some-Y	is not	Any-X
Any-Z	is not	Some-Y	$\propto$	Some-Z	is	all-Y
Any-Z	is not	Some-X		Some-Z	is not	Any-X

Any-Y	is not	Any-X		Some-Y	is	Some-X
Some-Z	is	Some-Y	$\propto$	Any-Z	is not	Any-Y
Some-Z	is not	Any-X		Any-Z	is not	Some-X

Any-Y	is not	Some-X		Some-Y	is	All-X
All-Z	is	Some-Y	$\propto$	Some-Z	is not	Any-Y
Any-Z	is not	Some-X		Some-Z	is not	Any-X

All-Y	is	Some-X		Some-Y	is not	Some-X
Some-Z	is not	Some-Y	$\propto$	Some-Z	is	All-Y
Some-Z	is not	Some-X		Some-Z	is not	Some-X

Some-Y	is	Some-X		Any-Y	is not	Some-X
Some-Z	is not	Any-Y	$\propto$	Some-Z	is	Some-Y
Some-Z	is not	Some-X		Some-Z	is not	Some-X

Surplus Moods,
(valid but redundant).

All-Y	is	[All]-X		Some-Y	is	some-X
Some-Z	is	Some-Y	∝	[All]-Z	is	All-Y
Some-Z	is	Some-X		Some-Z	is	Some-X

All-Y	is	[All]-X		Some-Y	is	All-X
All-Z	is	Some-Y	∝	[All]-Z	is	All-Y
All-Z	is	Some-X		Some-Z	is	All-X

[All]-Y	is	All-X		All-Y	is	Some-X
Some-Z	is	All-Y	∝	All-Z	is	[All]-Y
Some-Z	is	All-X		All-Z	is	Some-X

[All]-Y	is	Some-X
Some-Z	is	[All]-Y
Some-Z	is	Some-Y

All-Y	is	[All]-X		Some-Y	is not	Some-X
Some-Z	is not	Some-Y	∝	[All]-Z	is	All-Y
Some-Z	is not	Some-X		Some-Z	is not	Some-X

[All]-Y	is	All-X		Any-Y	is not	Some-X
Some-Z	is not	Any-Y	∝	All-Z	is	[All]-Y
Some-Z	is not	Any-X		Any-Z	is not	Some-X

All-Y	is	[All]-X		Some-Y	is not	Any-X
Any-Z	is not	some-Y	∝	[All]-Z	is	All-Y
Any-Z	is not	Some-X		Some-Z	is not	Any-X

[All]-Y	is	All-X		Any-Y	is not	Any-X
Any-Z	is not	Any-Y	∝	All-Z	is	[All]-Y
Any-Z	is not	Any-X		Any-Z	is not	Any-X

[All]-Y	is	some-X		Any-Y	is not	Any-X
Any-Z	is not	Any-Y	∝	Some-Z	is	[All]-Y
Any-Z	is not	Some-X		Some-Z	is not	Any-X

[All]-Y	is	Some-X		Any-Y	is not	Some-X
Some-Z	is not	[Any]-Y	∝	Some-Z	is	[All]-Y
Some-Z	is not	Some-X		Some-Z	is not	Some-X

The quantity 'All' in brackets in the Table of Surplus Moods indicates a redundant distribution: if 'Some' be written for '[All],' the consequence drawn is the same.

The sign ∝ standing between two syllogisms indicates that they are *congruous*, that is, that if in either syllogism X be written for Z and Z for X, the other results.

From the above Tables of Moods in the first figure, Tables of Moods in the second figure are obtained by simply *converting the sumption*, and Tables of Moods in the third figure by *converting the subsumption.*

For the purposes of natural expression, it is desirable to observe the rule of writing every affirmative proposition in such order of terms as will make the most extensive term the predicate.

For example, we prefer to say 'All-X is Some-Y' rather than the converse, because 'Y' is the broader term, a fact indicated by the quantity of both terms.

But, on the other hand, in negative propositions, we prefer saying 'Some-X is not Any-Y,' rather than the converse. When both terms are definite, however, as 'All-X is All-Y,' and 'Any-X is not Any-Y,' it is indifferent in which order the terms stand; as, in the latter case, we say, 'No-X is Y,' and 'No-Y is X' indifferently; and a similar remark applies to propositions in which both terms are indefinite, as 'Some-X is Some-Y,' 'Some-X is not Some-Y.'

The following table contains the moods applicable to any one or two of the figures or to all three of them. The distinctions are grounded upon two assumptions. First, that every proposition shall stand in the natural order of the terms according to the English language. Secondly, that congruous propositions shall be regarded as only one form of ratiocination.

For this purpose, and especially with a view to avoid any particular succession of the major and minor terms, let us write 'G' and 'Γ' for the major or minor terms, either being major or minor at pleasure, and we retain 'Y' as the sign of the middle term.

The following table then exhibits all the essentially distinct moods of syllogism of which the English language is susceptible.

All-Y is All-G	Any-Y is not Any-G	Good for figs. 1, 2, 3.
All-Γ is All-Y	Some-Γ is Some-Y	
All-Γ is All-G	Some-Γ is not Any-G	
Any-Y is not Any-G	Some-Y is Some-G	Good for figs. 1, 2, only.
All-Γ is Some-Y	Some-Γ is not Any-Y	
Any-Γ is not Any-G	Some-Γ is not Some-G	
All-Y is Some-G	All-Y is Some-G	Good for figs. 1, 3, only.
Some-Γ is Some-Y	Some-Γ is not Some-Y	
Some-Γ is Some-G	Some-Γ is not Some-G	

All-Y is Some-G	Good for fig. 1 only.
All-Γ is Some-Y	
All-Γ is Some-G	

Some-G is not Any-Y	Good for fig. 2 only.
All-Γ is Some-Y	
Some-G is not Any-Γ	

All-Y is Some-G	Good for fig. 3 only.
Some-Y is not Any-Γ	
Some-G is not Any-Γ	

In all then there are nine essential moods.

The following points must be carefully kept in view in studying this table.

1st. That in the form of syllogism it is indifferent which of the extreme terms is major, and which is minor. In fact, that 'G' and 'Γ' really differ in some point, either in quantity and kind, or in kind only; but as to the difference in kind, we know nothing whatever about it. We know that there is such a difference, and that is all.

2ndly. That in such form it is indifferent which premise is sumption, and which is subsumption.

3rdly. That the figure of the syllogism is only an unessential variety, and becomes of moment only in consequence of the peculiar idiom of the language in which the reasoning is expressed.

4thly. That the English language, in certain forms of affirmation and negation, necessitates a particular order of terms, and that this order is strictly observed in the above table.

5thly. That wherever a mood is competent for the first figure, its exemplar is written in that figure, that figure being at once the most formal, and the most natural.

Besides the thirty-six moods already investigated, there are twelve combinations, from which no inference can be drawn, viz.:

Some-Y is All-X		Some-Y is Some-X
Some-Z is Some-Y	$\propto$	All-Z is Some-Y
———————		———————
———————		———————
		5—2

Some-Y is All-X
All-Z is Some-Y

Some-Y is Some-X
Some-Z is Some-Y

Some-Y is All-X Some-Z is not Some-Y	$\propto$	Some-Y is not Some-X All-Z is Some-Y
Some-Y is All-X Any-Z is not Some-Y	$\propto$	Some-Y is not Any-X All-Z is Some-Y
Some-Y is Some-X Some-Z is not Some-Y	$\propto$	Some-Y is not Some-X Some-Z is Some-Y
Some-Y is Some-X Any-Z is not Some-Y	$\propto$	Some-Y is not Any-X Some-Z is Some-Y

The reason why no third proposition in 'Z' and 'X' results from any of these twelve pairs, is that in each case Aristotle's principle fails, which requires that the middle term 'Y' shall be distributed, (*i.e.* universally predicated) in one of the premises. In all these twelve pairs the middle term has in both premises the indefinite quantity *some.*

The feint of drawing an inference in such cases is called the fallacy of *the undistributed middle.* The following are examples of it:

I.

Some-Y′ is All-X
All-Z′ is Some-Y′

Non sequitur All-Z′ is All-X′

Some-cases of rarefaction are caused by heat,
All-comets are cases of rarefaction;

∴ All-comets are rarefied by heat.

II.

Some-Y is All-X
All-Z is Some-Y

Non sequitur All-Z is Some-X ... (1).

Some-cases of rarefaction are derived from other causes than heat,
All-comets are some-cases of rarefaction;

∴ All-comets are rarefied by something else than heat.

All-X is Some-W
All-Z is Some-X from (1).

All-Z is Some-W

All bodies undergoing rarefaction from some other cause than heat are cooled down;
All-comets are so rarefied;

∴ All comets by rarefaction are cooled down.

Here the effect 'X′' excludes the effect 'W'; that is, if the comet by rarefaction be made hotter it cannot be made cooler. The same informal concluding thus gives birth to opposite conclusions.

III.

Some-Y is All-X
Some or All-Z is All-Y

Some-Z is Some-X

Heat is caused by the proximity of comets,
It is hot to-day;

∴ Comets are near the earth to-day.

IV.

Some-X is All-Y
Some-Z is All-X

Some-Z is All-Y

Comets are discernible in hot weather,
To-day comets are seen;

∴ To-day it is hot.

Now if for *some*, wherever it is the quantity of the middle term 'Y', we write *certain*, in the sense of partial quantity definite or indefinite, and if we suppose that the 'Certain-Y' of the one premise in any pair, together with the 'Certain-Y' of the other premise in that pair, do together exceed the universal quantity of 'Y', then an inference can be drawn, which extends to a quantity of 'Y' *at least* equal to the difference between the two *certains*. In few words we say: If of two propositions the middle term be not distributed as predicate in either, but if it be quantified in both, and the sum of its quantities exceed its universal quantity, a consequent may be drawn. This is called the principle of the *ultra-total quantification* of the middle term[1]. For example:

Half the brigade were slain
A majority of the brigade were brave

Some brave men were slain

i. e. $\frac{\text{All}}{2}$-Y is Some-X

$> \frac{\text{All}}{2}$-Y is Some-Z

Some-Z is Some-X

Bearing in mind this condition of the overlapping of partial definites, we may write all the twelve moods which have been dismissed as incompetent, and state the consequents.

[1] First schematised by Lambert: named by Sir W. Hamilton.

Let Certain in the one premise be definite or indefinite, and [Certain] in the other premise be greater than the difference between *all* and *certain* in the first: or *vice versâ*.

Then the following twelve additional moods are valid; five being sufficient, and seven redundant.

Additional Moods.

Valid and sufficient.

Certain-Y is Some-X
Some-Z is [Certain]-Y

Some-Z is Some-X

Certain-Y is Some-X Some-Z is not [Certain]-Y	∝	Certain-Y is not Some-X Some-Z is [Certain]-Y
Some-Z is not Some-X		Some-Z is not Some-X
Certain-Y is Some-X Any-Z is not [Certain]-Y	∝	Certain-Y is not Any-X Some-Z is [Certain]-Y
Any-Z is not Some-X		Some-Z is not Any-X.

Surplus Moods.

Valid but redundant.

Certain-Y is [All]-X Some-Z is [Certain]-Y	∝	Certain-Y is Some-X [All]-Z is [Certain]-Y
Some-Z is Some-X		Some-Z is Some-X

Certain-Y is [All]-X
[All]-Z is [Certain]-Y

Some-Z is Some-X.

Certain-Y is [All]-X Some-Z is not [Certain]-Y ――――――― Some-Z is not Some-X	$\propto$	Certain-Y is not Some-X [All]-Z is [Certain]-Y ――――――― Some-Z is not Some-X
Certain-Y is [All]-X Any-Z is not [Certain]-Y ――――――― Any-Z is not Some-X	$\propto$	Certain-Y is not Any-X [All]-Z is [Certain]-Y ――――――― Some-Z is not Any-X

Writing each pair of congruous syllogisms as one, and adopting the notation already explained, the following represent the three valid sufficient forms:

Certain-Y is Some-G [Certain]-Y is Some-Γ ――――――― Some-Γ is Some-G	Good for Figs. I, II, III.
Certain-Y is Some-G [Certain]-Y is not Some-Z ――――――― Some-Γ is not Some-G	Good for Figs. I, II, III.
Certain-Y is Some-G [Certain]-Y is not any-Γ ――――――― Some-G is not any-Γ	Good for Fig. III.

The syllogism is sometimes presented under a form involving six (or perhaps more) terms, each premise exhibiting two (or perhaps more) propositions hypothetically connected. Accordingly some writers on logic have treated of these syllogisms under the head of hypothetical. But the fact is, that all such are immediately reducible to the assertorial form. The following are examples of this class of syllogisms.

In All cases where U is V Y is Z
In All cases where W is X U is V

In All cases where W is X Y is Z

In All cases where U is V Y is Z
In Some cases where W is X U is V

In Some cases where W is X Y is Z

In All cases where U is V Y is Z
In Some cases where U is V W is X

In Some cases where W is X Y is Z

In All cases where Y is Z U is V
In All cases where U is V W is X

In Some cases where W is X Y is Z

Now in these formulæ if 'U' with the attribute 'V' be 'U′', 'Y' with the attribute 'Z' be 'Y′', and 'W' with the attribute 'X' be 'W′', these syllogisms are reduced to the following assertorial forms.

All-U′ is Some-Y′
All-W′ is Some-U′

All-W′ is Some-Y′

All-U′ is Some-Y′
Some-W′ is Some-U′

Some-W′ is Some-Y′

All-U′ is Some-Y′
Some-U′ is Some-W′

Some-W′ is Some-Y′

All-Y′ is Some-U′
All-U′ is Some-W′

Some-W′ is Some-Y′

It is obvious that by reference to the tables of moods, hypothetical syllogisms may be multiplied without limit.

The syllogisms that we have already treated of are designated 'Figured Syllogisms,' in contradistinction to another class which we have hitherto kept out of sight.

The canon of the unfigured syllogism is the following.

In as far as two concepts, either both agreeing or, one agreeing the other does not, with a common third concept, in so far these notions do, or do not agree with each other.

The unfigured syllogism in the terms 'G,' 'Y,' 'Γ' expresses either that 'G and Y are *identical*, (that is the same in kind and quantity), or not identical, as the case may be, and that Y and Γ are identical, or not identical; and that therefore G and Γ are identical, or not identical, as the case may be: or, on the other hand, that G and Y are the same in kind, but that G is in Y, and that Y and Γ are the same in kind, but that Y is in Γ, and therefore that G is in Γ: or that G, Y and Γ being of the same kind, Y is in G, and Γ is in Y; and therefore that Γ is in G.'

In such syllogisms there are indeed two extreme terms and a middle term, but no term is subject or predicate in any proposition; and it will be often found that the attempt to reduce the unfigured syllogism to the figured is fraught with complexity and redundancy, if not with absurdity.

The student may, for practice, try the experiment of throwing the unfigured syllogism, 'the fruit is bigger than the stone, the stone is bigger than the kernel; therefore the fruit is bigger than the kernel,' into a figured syllogism.

Syllogisms, besides being figured and unfigured, are also analytic and synthetic. In the former, which is the most natural method of reasoning, the consequence is expressed first, and the premises then stated as its reasons. In the latter, which is that cultivated by logicians, and to which therefore exclusively all logical nomenclature is relative, the premises precede, and, as it were, effectuate the consequence. Example. If it be asked, 'is Z in X'? we reply analytically 'Yes; for Z is in Y, and Y is in X'; but synthetically we should reply 'Yes; for Y is in X, and Z is in Y'; the syllogisms in both cases being unfigured.

PART V.

OF CHAINS OF REASONING, DEDUCTIVE AND INDUCTIVE.

In rendering logical processes subservient to purposes of science, the mode of procedure is, to a certain extent, determined by the nature of the subject-matter.

To that extent therefore the discussion of method is excluded from a treatise on formal logic.

The pure logical aspects of continuous chains of reasoning are but two.

Reasoning may be analytic or synthetic; it may be deductive or inductive.

For the sake of perspicuity, we will first investigate the distinction between deductive and inductive reasoning.

In deduction we reason from the whole to the parts, from the genus to the species, from the species to the individual.

All the forms of syllogism with which we have had as yet to deal are deductive.

The deductive syllogism may be figured or unfigured.

In a simple chain of deductive syllogisms we start from the greatest whole either in extension or comprehension, and we terminate with an individual object, or the all-embracing attribute.

Induction, on the other hand, is reasoning from the parts to the whole, from the individual to the species, from the species to the genus. The inductive syllogism is in one figure only. In a simple chain of inductive syllogisms we start from the individual objects, or the shallowest attributes, and we reason to the most extensive class, or to the most complex object (extension or intension). Accordingly (employing for the sake of illustration the whole of extension only), we may descend from the most extensive whole to the smallest constituent parts by a chain of deductive syllogisms, and we may ascend through the same series back to the greatest whole by a chain of inductive syllogisms; or, on the other hand, we may first ascend by induction, and then descend by deduction. These two logical procedures are as it were the converse of each other. Hopeless then, nay absurd, must appear the attempt of nearly all logicians to assimilate the one procedure to the other.

Some have endeavoured to shew that the inductive syllogism belongs to the third figure; others, that it ought to be classed with hypotheticals. Both views are manifestly erroneous. Let us take examples of a single inductive, and a single deductive syllogism, in extension, the two being the converse of each other.

Inductive.	*Deductive.*
c, c', c'', are Some-A	All-B is Some-A
c, c', c'', are All-B	c, c', c'', are Some or All-B
∴ All-B is Some-A	∴ c, c', c'', are Some-A

In the inductive syllogism the predicate of the second premise must be universal, or, in other words, c, c', c'', must be constituents of a given whole. When this is the case the induction is said to be complete. It is worthy of observation that if this predicate be indefinite, no conclusion can be drawn; the premises c, c', c'', are Some-A, and c, c', c'', are Some-B, being incompetent. For example:

Isaac, Levi, and Abraham, are avaricious,
Isaac, Levi, and Abraham, are All-the-Jews;
∴ All Jews are avaricious.

This conclusion is just; but if the three individuals named do not constitute all the Jews, no conclusion at all can be drawn. It is true, that by indefinitely increasing the number of individuals that collectively form the subject of both premises, that is, by indefinitely approximating to the universe of Jews, the conclusion can be made more and more probable; but until our induction exhausts the universe, that is, until we have found every individual Jew to be avaricious, we have no right to predicate that fact apodictically; and it must be remembered that logic deals with none but necessary reasoning.

We may extend what has been said on the inductive syllogism to chains of reasoning of all sorts. The simplest case is where the individuals ϵ, ϵ', ϵ'', belong to a species δ, that species to a genus γ, γ to a genus β, and β to a summum genus α: or we may extend the generalisation still higher. In the example given the following are the inductive and deductive series respectively.

Inductive.	*Deductive.*
ϵ, ϵ', ϵ'', are Some-α	All-β is Some-α
ϵ, ϵ', ϵ'', are All-δ	All-γ is Some-β
All-δ is Some-α	All-γ is Some-α
All-δ is Some-α	All-γ is Some-α
All-δ is Some-γ	All-δ is Some-γ
Some-γ is Some-α	All-δ is Some-α
Some-γ is Some-α	All-δ is Some-α
All-γ is Some-β	ϵ, ϵ', ϵ'', are All or Some-δ
Some-β is Some-α	ϵ, ϵ', ϵ'', are Some-α

It is seldom, in the application of logic to science, that any inductive operation involving a longer chain of syllogisms is employed. The difficulty and complexity of an inductive process lies in something else than the length of the chain of reasoning, or in any of the formal details of the syllogisms employed.

In the domain of nature everything is presented to us under the forms of substance and accident, cause and effect, or action and reaction.

Under the first form our judgments are assertorial, that is, a predicate is simply affirmed (or denied) of a subject. Under the second form our judgments are conjunctive, one proposition being affirmed (or denied) as the consequence of another of which it is logically independent. Under the third form our judgments are disjunctive, an alternative being presented between two or more propositions. Now in point of fact these three forms are cognizable under a single form, since the accident may always be affirmed (or denied) as the effect of the substance, and in the case of action and reaction, either may stand as cause, and the other as effect. Accordingly, in the investigation of nature, with a view to determine the dependence of phenomena upon each other, the occupation of the observer and inductive reasoner is commonly called the search after causes. Now as logic can take no cognizance of the content or matter contained in any term or proposition, it is manifestly out of its province to inquire whether two phenomena (presented in the form of propositions) are connected by the relation of substance and accident, cause and effect, or action and reaction. The business of logic is simply to consider the relation of *identity* subsisting between two or more propositions formally distinct.

We proceed then to investigate the syllogistic forms, hypothetical of course, under which the inductive philosophy can conclude, from observation and experiment, that two observed phenomena are universally connected in a certain manner.

It is of course assumed that the laws of nature are constant, and that the like effects follow the like causes in the absence of neutralising or modifying concurrent causes. It is by virtue of this assumption that the conclusions are invested with the character of universality.

Now let us assume that we are presented with a given instance which is analysed and resolved into four phenomena X′, X″, X‴, and Z. Let Z be the phenomenon whose cause we seek, and let X′ and X″ be two assigned causes selected on account of some apparent probability that one or other is the cause we seek. Then X‴ is called the Residual Phenomenon, and of course if neither X′ nor X″ be the cause sought that cause will be found among the constituents of the residual phenomenon. Now let us suppose that the circumstances of the case permit us to experimentalize on the effect of any two of the three constituents X′, X″, and X‴; then the following are the only possible results.

I. X′ and X″ give Z, X′ and X‴ give Z, X″ and X‴ do not give Z.
II. X′ and X″ give Z, X′ and X‴ do not give Z, X″ and X‴ give Z.
III. X′ and X″ do not give Z, X′ and X‴ do not give Z, X″ and X‴ give Z.
IV. X′ and X″ do not give Z, X′ and X‴ give Z, X″ and X‴ do not give Z.
V. X′ and X″ do not give Z, X′ and X‴ give Z, X″ and X‴ give Z.
VI. X′ and X″ give Z, X′ and X‴ do not give Z, X″ and X‴ do not give Z.
VII. X′ and X″ give Z, X′ and X‴ give Z, X″ and X‴ give Z.

These are the only practicable combinations. From I. it follows that X′ is the cause sought.

From II. that X″ is the cause sought. From III. it follows that X′ is a contradictory cause, and from IV. that X″ is a contradictory cause. From V. we learn that the required cause is to be sought for in the residual phenomenon, and from VI. that the residual phenomenon contains a contradictory cause. From VII. we learn that X′, X″, and X‴ are all three equivalent causes. These results are susceptible of a syllogistic schematism.

Let the concurrence of X′ and X″ present the phenomenon Y′. Let the concurrence of X′ and X‴ present the phenomenon Y″, and let the concurrence of X″ and X‴ present the phenomenon Y‴. Then from I. we have the following schematism:

In all cases where Y′ is Z is.
In all cases where Y′ is X‴ is not.

Therefore in some cases where Z is X‴ is not.

In all cases where Y″ is Z is.
In some cases where Y″ is X″ is not.

Therefore in some cases where Z is X″ is not.

Either in all cases where Z is X′ is, or in all cases where Z is X″ is, or in all cases where Z is X‴ is.

But in some cases where Z is X‴ is not, and in some cases where Z is X″ is not.

Therefore in all cases where Z is X′ is.

In this disjunctive illation, the truth of the sumption depends on the fact that X′, X″, and X‴

comprise the whole universe of phenomena. Of course no induction can extend so far as that in practice the major premiss in question is of problematical modality only; but logic, as we have seen, takes no cognizance of the problematical or presumptive, but only of the assertorial.

From II. we have the following schematism:

In all cases where Y′ is Z is.
In all cases where Y′ is X‴ is not.

Therefore in some cases where Z is X‴ is not.

In all cases where Y‴ is Z is.
In all cases where Y‴ is X is not.

Therefore in some cases where Z is X′ is not.

Either in all cases where Z is X′ is, or in all cases where Z is X″ is, or in all cases where Z is X‴ is.

But in some cases where Z is X‴ is not, and in some cases where Z is X′ is not.

Therefore in all cases where Z is X″ is.

From III. we have the following schematism:

In all cases where Y′ is Not -Z is.
In all cases where Y′ is Z‴ is not.

Therefore in some cases where Not -Z is X‴ is not.

In all cases where Y″ is Not -Z is.
In all cases where Y″ is X″ is not.

Therefore in some cases where Not -Z is X″ is not.

Either in all cases where Not -Z is X′ is, or in all cases where Not -Z is X″ is, or in all cases where Not -Z is X‴ is.

But in some cases where Not -Z is X‴ is not, and in some cases where Not -Z is X″ is not.

Therefore in all cases where Not -Z is X′ is.

From IV. we have the following schematism:

In all cases where Y′ is Not -Z is.
In all cases where Y′ is X‴ is not.

Therefore in some cases where Not -Z is X‴ is not.

In all cases where Y‴ is Not -Z is.
In all cases where Y‴ is X′ is not.

Therefore in some cases where Z is X′ is not.

Either in all cases where Not -Z is X′ is, or in all cases where Not -Z is X″ is, or in all cases where Z is X‴ is.

But in some cases where Not -Z is X‴ is not, and in some cases where Not -Z is X′ is not.

Therefore in all cases where Not -Z is X″ is.

In a similar manner the schematisms V. and VI. might be written. The conclusions from V, viz. where Z is X‴ is, merely informs us that the cause of Z is to be sought for in X‴, the residual phenomenon.

The conclusion from VI, where Not-Z is X‴ is, merely informs us that in the residual phenomenon X‴ there is a cause, but for which Z would be present. The result of VII shews that the selection of assumed causes X′ and X″ was unskilful or unlucky, and recourse must be had again to experiment.

Syllogisms by hypothesis.

Syllogisms are often employed hypothetically in a chain of reasoning. The following example may serve for an illustration. To prove that if there are more hairy people in the world than hairs on any one, two persons at least must have the same number of hairs.

I.

(Simple Illation.)

All the hairy people are more in number than the hairs of any one. (Datum.)

Therefore All the hairy people in the world are more in number than the hairs on A.

II.

The number of hairs on A is equal to the number of different numbers of hairs from 1 to the number A has. (Mathematical truth.)

All the hairy people in the world are more in number than the hairs on A. (Consequent of I.)

Therefore all the hairy people in the world are more in number than the different numbers of hairs from 1 to the number of hairs on A.

The next is an assertorial syllogism hypothetically posited.

III.

Let every one of the hairy people in the world have a different number of hairs from the number on any one else. (Hypothesis.)

All the hairy people in the world are more in number than the different number of hairs from 1 to the number A has. (Consequent of II.)

Therefore some (one at least) of the hairy people in the world have higher number of hairs on them than the number A has.

IV.

(Disjunctive Illation.)

Either each of the hairy people in the world has a different number of hairs from that on any one else; or some (two at least) have the same number of hairs. (Mathematical truth.)

But if the first alternative be true, there are some (one at least) who have higher numbers of hairs on them than the number A has, which is the contradictory of the datum.

Therefore some (two at least) have the same number of hairs.

This example, which belongs rather to applied than to formal logic, is introduced with the view of shewing in a small compass, the value of a suppository assertorial syllogism[1]. The use made

[1] Is not this the syllogism which Aristotle calls ἐξ ὑποθέσεως?

of it in the preceding example, is called the *Reductio ad absurdum.*

Without infringing on the sphere of applied logic, it is difficult to discuss the subject of analysis and synthesis as methods of teaching science and of investigating scientific truths. Whether the names be well or ill applied, as discriminating between algebraical and geometrical processes, is a matter of great doubt. We have already employed these terms to designate the direct and inverse methods of stating an argument. (See p. 76). The student must carefully bear in mind that no such sense is to be attributed to the terms analytical and synthetical as applied to distinguish such processes as those of algebra and geometry. I specify algebra and geometry, simply because these are the only sciences in which the two processes we are speaking of are exhibited in perfection.

In the opinion of the writer both those processes are deductive, and further, that there is no logical difference between them; in other words, they differ only in their subject matter.

THE END.

MACMILLAN & CO.'S PUBLICATIONS.

ÆSCHYLI Eumenides.
The Greek Text with English Notes: with an Introduction, containing an Analysis of C. O. Müller's Dissertations; and an English Metrical Translation. By BERNARD DRAKE, M.A., Fellow of King's College, Cambridge; Editor of "Demosthenes de Corona." 8vo. cloth, 7*s*. 6*d*.

ANTHOLOGIA Latina Selecta. In 2 vols. Small 8vo.
VOL. I.—Containing select Epigrams of Catullus, Virgil, Claudian, Ausonius, with others from the Anthologia Latina.

VOL. II.—Containing select Epigrams of Martial.

Edited with English notes, by J. E. B. MAYOR, M.A., Fellow and Classical Lecturer of St. John's College, Cambridge, Editor of Juvenal.

[*Preparing.*

ARISTOPHANES. The Greek Text revised, with a Commentary. By W. G. CLARK, M.A., Fellow and Assistant Tutor of Trinity College. [*Preparing.*

ARISTOTELES de Rhetorica. The Greek Text, with English Notes. By A FELLOW OF TRINITY COLLEGE. [*Preparing.*

ARISTOTLE on the Vital Principle. Translated from the Original Text, with Notes. By CHARLES COLLIER, M.D., F.R.S., Fellow of the Royal College of Physicians. Crown 8vo. cloth, 8*s*. 6*d*.

BEAMONT.—Catherine, the Egyptian Slave in 1852. A Tale of Eastern Life. By W. J. BEAMONT, M.A., Fellow of Trinity College, Cambridge, late Principal of the English College, Jerusalem. Fcap. 8vo. 5*s*.6*d*.

BENGELII GNOMON NOVI TESTAMENTI, in quo ex Nativa Verborum vi simplicitas, profunditas, concinnitas, salubritas ensuum cœlestium indicatur. EDITIO TERTIA. Imperial 8vo. cloth, 18*s*.

BIRKS.—The Difficulties of Belief in connexion with the Creation and the Fall. By THOMAS RAWSON BIRKS, M.A., Rector of Kelshall, Formerly Fellow of Trinity College; Author of "The Life of the Rev. G. Bickersteth." Crown 8vo. cloth, 4*s*. 6*d*.

CONTENTS. Introduction.—On the Knowledge of God. Chap. I.—On the Power of God. II.—On the Nature of God. III.—On the Creation of Free Agents. IV.—On Temptation in Free Agents. V.—On the Creation and Fall of Angels. VI.—On the Creation and Fall of Man. VII.—On the Permission of Satanic Temptation. VIII. & IX.—On Original Sin.

BOLTON.—The Evidences of Christianity as Exhibited in the Writings of its Apologists down to Augustine. An Essay which obtained the Hulsean Prize for the Year 1852. By W. J. BOLTON, of Gonville and Caius College, Cambridge. 8vo. cloth, 6s.

BRAVE WORDS for BRAVE SOLDIERS and SAILORS. **Tenth Thousand.** 16mo. sewed, 2d.; or 10s. per 100.
[*Printed for Distribution.*

BUTLER (Professor Archer).—Sermons, Doctrinal and Practical. By the Rev. WILLIAM ARCHER BUTLER, M.A. late Professor of Moral Philosophy in the University of Dublin. Edited, with a Memoir of the Author's Life, by the Very Rev. THOMAS WOODWARD, M.A. Dean of Down. With Portrait. **Third Edition.** 8vo. cloth, 12s.

BUTLER (Professor Archer).—A Second Series of Sermons. Edited from the Author's Manuscripts, by J. A. JEREMIE, D.D. Regius Professor of Divinity in the University of Cambridge. 8vo. cloth. 10s. 6d.

BUTLER (Professor Archer).—Lectures on the History of Ancient Philosophy. By the Rev. W. ARCHER BUTLER, late Professor of Moral Philosophy in the University of Dublin. Edited, from the Author's Manuscripts, by WILLIAM HEPWORTH THOMPSON, M.A. Regius Professor of Greek in the University of Cambridge. 2 vols. 8vo. cloth, 1*l.* 5s.

BUTLER (Professor Archer).—Letters on Romanism, in Reply to Mr. NEWMAN'S Essay on Development. Edited by the Very Rev. T. WOODWARD, Dean of Down. 8vo. cloth, 10s. 6d.

BUTLER.—A Hand Book to Butler's Analogy. With a few Notes. By C. A. SWAINSON, M.A. Principal of Chichester Theological College, formerly Fellow and Tutor of Christ's College, Cambridge. Crown 8vo. 1s. 6d.

CAMBRIDGE.—Cambridge Theological Papers. Comprising those given at the Voluntary Theological and Crosse Scholarship Examinations. Edited, with References and Indices, by A. P. MOOR, M.A. of Trinity College, Cambridge, and Sub-warden of St. Augustine's College, Canterbury. 8vo. cloth, 7s. 6d.

CAMBRIDGE PROBLEMS.—Solutions of the Senate-House Riders for Four Years (1848 to 1851). By F. J. JAMESON, M.A. Fellow of Caius College, Cambridge. 8vo. cloth, 7s. 6d.

CAMBRIDGE PROBLEMS.—Solutions of Senate-House Problems for Four Years (1848 to 1851). By N. M. FERRERS, and J. S. JACKSON, Fellows of Caius College, Cambridge. 8vo. cloth, 15s. 6d.

CAMBRIDGE PROBLEMS, 1854.—Solutions of the Problems proposed in the Senate House Examination, January 1854. By the Moderators (W. WALTON, M.A. Trinity College, and C. F. MACKENZIE, M.A. Fellow of Caius College). In 8vo. cloth, 10s. 6d.

CAMBRIDGE.—Cambridge Guide: Including Historical and Architectural Notices of the Public Buildings, and a concise Account of the Customs and Ceremonies of the University, with a Sketch of the Places most worthy of Note in the County. A New Edition, with Engravings and a Map. 12mo. cloth, 5*s.*

CAMBRIDGE FITZWILLIAM MUSEUM.—A Hand-Book to the Pictures in the Fitzwilliam Museum, Cambridge. Crown 8vo. sewed, 1*s.* 6*d.*; or in cloth elegant, 2*s.* 6*d.*

CAMBRIDGE.—Cambridge Mathematical Journal. Vol. I. Second Edition, 8vo. cloth, 18*s.*

CAMBRIDGE.—Cambridge and Dublin Mathematical Journal. *The Complete Work*, in Nine Vols. 8vo. cloth, 7*l.* 4*s.*

ONLY A FEW COPIES OF THE COMPLETE WORK REMAIN ON HAND.

CAMPBELL.—The Nature of the Atonement and its Relation to Remission of Sins and Eternal Life. By JOHN M'LEOD CAMPBELL. 8vo. cloth, 10*s.* 6*d.*

COLENSO.—Ten Weeks in Natal. A Journal of a First Tour of Visitation among the Colonists and Zulu Kafirs of Natal. By the Right Rev. JOHN WILLIAM COLENSO, D.D. Bishop of Natal, with a Map and Illustrations. Fcap. 8vo. cloth, 5*s.*

COLENSO.—An Ordination and Three Missionary Sermons. By the Right Rev. JOHN WILLIAM COLENSO, D.D. Bishop of Natal. 18mo. 1*s.*

COLENSO.—Village Sermons. By the Right Rev. JOHN WIL-LIAM COLENSO, D.D. Bishop of Natal. **Second Edition.** Fcap. 8vo. cloth, 2*s.* 6*d.*

COLENSO.—The Communion Service, from the Book of Common-Prayer, with Select Readings from the writings of the Rev. F. D. MAURICE, M.A. Edited by the Right Rev. JOHN WILLIAM COLENSO, D.D., Bishop of Natal. *Fine Edition*, rubricated and bound in morocco, antique style, 6*s.*; or in cloth, 2*s.* 6*d.* *Common Paper*, lymp cloth, 1*s.*

COOPER.—A Geometrical Treatise on Conic Sections. By the Rev. J. E. COOPER, M.A. late Fellow of St. John's College, Cambridge. [*Preparing.*

COTTON.—Sermons: chiefly connected with Public Events of 1854. By G. E. LYNCH COTTON, M.A. Master of Marlborough College, formerly Fellow of Trinity College, Cambridge. Fcap. 8vo. cloth, 3*s.*

DAVIES.—St. Paul and Modern Thought: Remarks on some of the Views advanced in Professor Jowett's Commentary on St. Paul. By Rev. J. LL. DAVIES, M.A. Fellow of Trinity College, Cambridge, and Incumbent of St. Mark's, Whitechapel. 8vo. 2*s.* 6*d.*

DEMOSTHENES.—Demosthenes de Corona. The Greek Text, with English Notes. By BERNARD DRAKE, M.A. Fellow of King's Coll. Cambridge, Editor and Translator of the "Eumenides of Æschylus." Crown 8vo. cloth, 5*s.*

DEMOSTHENES.—Translation of Demosthenes on the Crown. By J. P. NORRIS, M.A. Fellow of Trinity College, Cambridge and one of Her Majesty's Inspectors of Schools. Crown 8vo. cloth, 3*s*.

DRAKE.—Notes Explanatory and Critical on the Books of Jonah and Hosea. By WILLIAM DRAKE, M.A. late Fellow of St. John's College, Cambridge. 8vo. cloth, 9*s*.

EVANS.—Sonnets on the Death of the Duke of Wellington, by SEBASTIAN EVANS. 8vo. sewed, 1*s*.

FERRAR.—Lives of Nicholas Ferrar, Fellow of Clare Hall. By his BROTHER JOHN, and Dr. JEBB. Now first Edited, with Illustrations, by J. E. B. MAYOR, M.A., Fellow and Assistant Tutor of St. John's College, Cambridge. Fcap. 8vo. cloth, 7*s*. 6*d*.

FLOWERS OF THE FOREST.—A War Ballad for January 1855. By M. A. H. Crown 8vo. 6*d*.

FROST.—The First Three Sections of Newton's Principia. With Notes and Problems in illustration of the subject. By PERCIVAL FROST, M.A. late Fellow of St. John's College, Cambridge, and Mathematical Lecturer of Jesus College. Crown 8vo. cloth, 10*s*. 6*d*.

FROST.—Thucydides, Book VI. The Greek Text, and English Notes: with a Map of Syracuse. By PERCIVAL FROST, Jun. M.A. late Fellow of St. John's College, Cambridge. 8vo. cloth, 7*s*. 6*d*.

GODFRAY.—An Elementary Treatise on the Lunar Theory. With a brief Sketch of the History of the Problem up to the time of Newton. By HUGH GODFRAY, B.A. of St. John's College, Cambridge. 8vo. cloth, 5*s*. 6*d*.

GOODWIN.—How Christ's Promises are fulfilled.
A Farewell Sermon preached on the occasion of the departure of the Bishop of Natal, and the other members of the Natal Mission. By HARVEY GOODWIN, M.A., Minister of St. Edward's, and Hulsean Lecturer in the University of Cambridge. 8vo. sewed. 1*s*.

GRANT.—Plane Astronomy.
Including Explanations of Celestial Phenomena, and Descriptions of Astronomical Instruments. By A. R. GRANT, M.A., one of Her Majesty's Inspectors of Schools, late Fellow of Trinity College, Cambridge. 8vo. boards, 6*s*.

HALLIFAX.—Bishop Hallifax's Analysis of the Civil Law. In which a comparison is occasionally made between the Roman Laws and those of England. A new Edition, with alterations and additions, being the heads of a Course of Lectures publicly delivered in the University of Cambridge, by J. W. GELDART, LL.D. 8vo. bds. 8*s*. 6*d*.; interleaved, 10*s*. 6*d*.; double interleaved, 12*s*. 6*d*.

HARE.—Charges to the Clergy of the Archdeaconry of Lewes, delivered at the Ordinary Visitations from the Year 1840 to 1854. With Notes on the Principal Events affecting the Church during that period. By JULIUS CHARLES HARE, M.A. Archdeacon. With an Introduction, explanatory of his position in the Church with reference to the parties which divide it. 3 vols. 8vo. cloth, 1*l*. 11*s*. 6*d*.

HARE.—Charges to the Clergy of the Archdeaconry of Lewes, delivered at the Ordinary Visitations in the Years 1843, 1845, 1846. By JULIUS CHARLES HARE, M.A. Archdeacon. Never before published. With an Introduction, explanatory of his position in the Church with reference to the parties which divide it. *6s. 6d.*

HARE.—Miscellaneous Pamphlets on some of the Leading Questions agitated in the Church during the last Ten Years. 8vo. cloth, 12*s.*

*** As only a very small Edition of the Collected Pamphlets has been made up, an early application is requested.

HARE.—The Victory of Faith.
Second Edition. 8vo. cloth, *5s.*

HARE.—The Mission of the Comforter.
Second Edition. With Notes. 8vo. cloth, 12*s.*

HARE.—Vindication of Luther from his English Assailants.
Second Edition. 8vo. cloth, *7s.*

HARE.—The Contest with Rome.
With Notes especially in answer to Dr. Newman's recent Lectures. **Second Edition.** 8vo. cloth, 10*s. 6d.*

HARE.—Parish Sermons.
Second Series. 8vo. cloth, 12*s.*

HARE.—Portions of the Psalms in English Verse.
Selected for Public Worship. 18mo. cloth, 2*s. 6d.*

HARDWICK.—Christ and other Masters.
An Historical Inquiry into some of the chief Parallelisms and Contrasts between Christianity and the Religious Systems of the Ancient World. With special reference to prevailing Difficulties and Objections. By CHARLES HARDWICK, M.A., Fellow of St. Catherine's Hall, Divinity Lecturer at King's College, and Christian Advocate in the University of Cambridge. Pt. I. 8vo. cloth, *7s. 6d.*

HARDWICK.—A History of the Christian Church, during the Middle Ages. By CHARLES HARDWICK, M.A. Fellow of St. Catharine's Hall, Divinity Lecturer in King's College, and Christian Advocate in the University of Cambridge. Author of "A History of the XXXIX. Articles." With Four Maps constructed for this Work by A. KEITH JOHNSTON. Crown 8vo. cloth, 10*s. 6d.*

HARDWICK.—A History of the Christian Church during the Reformation. By CHARLES HARDWICK, M.A. Crown 8vo. cloth, 10*s. 6d.*

*** These two Books are part of a Series of Theological Manuals now in progress.

HARDWICK.—Twenty Sermons for Town Congregations. By CHARLES HARDWICK, M.A. Crown 8vo. cloth, *6s. 6d.*

HARE.—Two Sermons preached in Herstmonceux Church, on Septuagesima Sunday, February 4, 1855, being the Sunday after the Funeral of the Venerable Archdeacon Hare. By the Rev. H. VENN ELLIOTT, Perpetual Curate of St. Mary's, Brighton, late Fellow of Trinity College, Cambridge, and the Rev. J. N. SIMPKINSON, Rector of Brington, Northampton, formerly Curate of Herstmonceux. 8vo. 1*s*. 6*d*.

HEMMING.—An Elementary Treatise on the Differential and Integral Calculus. For the Use of Colleges and Schools. By G. W. HEMMING, M.A. Fellow of St. John's College, Cambridge. **Second Edition,** with Corrections and Additions. 8vo. cloth, 9*s*.

HERVEY.—The Genealogies of our Lord and Saviour Jesus Christ, as contained in the Gospels of St. Matthew and St. Luke, reconciled with each other and with the Genealogy of the House of David, from Adam to the close of the Canon of the Old Testament, and shown to be in harmony with the true Chronology of the Times. By Lord ARTHUR HERVEY, M.A. Rector of Ickworth with Horringer. 8vo. cloth, 10*s*. 6*d*.

HERVEY.—The Inspiration of Holy Scripture. Five Sermons preached before the University of Cambridge, in the month of December 1855. 8vo. cloth, 3*s*. 6*d*.

HOWARD.—The Book of Genesis, according to the Version of the LXX. Translated into English, with Notices of its Omissions and Insertions, and with Notes on the Passages in which it differs from our Authorized Version. By the Hon. HENRY E. J. HOWARD, D.D. Dean of Lichfield. Crown 8vo. cloth, 8*s*. 6*d*.

HOWES.—A History of the Christian Church during the First Six Centuries. By J. G. HOWES, M.A. Fellow of St. Peter's Coll. Camb. [*Nearly ready.*

*** This is part of a Series of Theological Manuals now in progress.

HULBERT.—The Gospel Revealed to Job: or Patriarchal Faith and Practice illustrated. By C. A. HULBERT, M.A. 8vo. cloth, 12*s*.

HUMPHREYS.—Exercitationes Iambicae; or, Progressive Exercises in Greek Iambic Verse. To which are prefixed, the Rules of Greek Prosody, with copious Notes and Illustrations of the Exercises. By E. R. HUMPHREYS, LL.D. Head Master of the Cheltenham Grammar School. **Second Edition.** Fcap. cloth, 5*s*. 6*d*.

JEREMIE.—Two Sermons Preached before the University of Cambridge, on April 26, 1854, and March 21, 1855, being the Days appointed for General Humiliation and Prayer. By J. A. JEREMIE, D.D. Regius Professor of Divinity. 8vo. 2*s*.

JEREMIE.—Sermon preached before the University of Cambridge, on July 1st, 1855, on the occasion of the Death of PROFESSOR BLUNT. By J. A. JEREMIE, D.D. 8vo. sewed, 1*s*.

JEWELL.—An Apology of the Church of England, and an Epistle to Seignior Scipio concerning the Council of Trent, translated from the original Latin, and illustrated with Notes, chiefly drawn from the Author's "Defence of the Apology." By A. T. RUSSELL. Fcp. 8vo. bds. 5*s*.

JUSTIN MARTYR.—S. Justini Philosophi et Martyris Apologia Prima. Edited, with a corrected Text, and English Introduction and explanatory Notes, by W. TROLLOPE, M.A. Pembroke College, Cambridge. 8vo. bds. *7s. 6d.*

JUVENAL.—Juvenal: chiefly from the Text of Jahn. With English Notes for the Use of Schools. By J. E. B. MAYOR, M.A. Fellow and Classical Lecturer of St. John's College, Cambridge. Crown 8vo. cloth, *10s. 6d.*

KENNEDY.—The Influence of Christianity upon International Law. The Hulsean Prize Essay in the University of Cambridge for the year 1854. Crown 8vo. cloth, *4s.*

KINGSLEY.—"Westward Ho!" or, the Voyages and Adventures of Sir Amyas Leigh, Knight, of Burrough, in the County of Devon, in the Reign of Her Most Glorious Majesty Queen Elizabeth. By CHARLES KINGSLEY. **Second Edition.** 3 vols. crown 8vo. *1l. 11s. 6d.*

KINGSLEY.—The Heroes: or, Greek Fairy Tales for my Children. With Eight Illustrations after Drawings by the Author. In 8vo. beautifully printed on tinted paper, and elegantly bound in cloth, with gilt leaves, *7s. 6d.*

"If the public accept our recommendation, Mr. Kingsley's little book will run through many editions."—*Guardian*, March 12, 1856.

KINGSLEY.—Glaucus; or, the Wonders of the Shore. **Second Edition.** With a Frontispiece. Fcap. 8vo. cloth, *3s. 6d.*

KINGSLEY.—Alexandria and Her Schools: being Four Lectures delivered at the Philosophical Institution, Edinburgh. With a Preface. Crown 8vo. cloth, *5s.*

KINGSLEY.—Phaethon; or Loose Thoughts for Loose Thinkers. **Second Edition.** Crown 8vo. boards, *2s.*

LATHAM.—Geometrical Problems in the Properties of Conic Sections. By H. LATHAM, M.A. Fellow and Tutor of Trinity Hall. 8vo. sewed, *3s. 6d.*

LECTURES to Ladies on Practical Subjects. Delivered in London during the month of July, 1855, by the Rev. F. D. MAURICE, Professor TRENCH, Archdeacon ALLEN, J. S. BREWER, J. LL. DAVIES, CHARLES KINGSLEY, Dr. CHAMBERS, Dr. SIEVEKING, Dr. JOHNSON, TOM TAYLOR, Esq., and F. J. STEPHEN, Esq. **Second Edition.** Crown 8vo. cloth, *7s. 6d.*

LETTERS from Italy and Vienna. Small 8vo. cloth, *5s. 6d.*

LUND.—A Short and Easy Course of Algebra.
Chiefly designed for the use of the Junior Classes in Schools, with a numerous collection of Original easy Exercises. By THOMAS LUND, B.D. late Fellow of St. John's College, Cambridge. **Second Edition.** 12mo. cloth, 3s. 6d.

LUSHINGTON.—La Nation Boutiquière: and other Poems,
chiefly Political. With a Preface. By the late HENRY LUSHINGTON, Chief Secretary to the Governor of Malta. **Points of War.** By FRANKLIN LUSHINGTON, Judge in the Supreme Courts of the Ionian Isles. In 1 vol. fcap. 8vo. cloth, 3s.

MACKENZIE.—The Christian Clergy of the first Ten Centuries:
their Influence on European Civilization. By HENRY MACKENZIE. B.A. formerly Scholar of Trinity College, Cambridge. Crown 8vo. cloth, 6s. 6d.

MANSFIELD.—Letters from Brazil, Buenos Ayres, and
Paraguay. With a Map. Edited from the Author's MSS. With a Sketch of his Life. By the Rev. CHARLES KINGSLEY. [*Just ready.*

MANSFIELD.—On the Constitution of Salts.
Edited from the Author's MS. by N. H. S. MASKELYNE, M.A. Wadham College, and Reader in Mineralogy in the University of Oxford. [*In the Press.*

M'COY.—Preparing for Publication; to be completed in about Five Parts, price 5s. each, forming One Volume 8vo. of about 500 pages, with nearly 1,000 illustrations in the text, drawn and engraved by the Author,

A Manual of the Genera of British Fossils.
Comprising Systematic Descriptions of all the Classes, Orders, Families, and Genera of Fossil Animals found in the Strata of the British Isles; with figures of all the Generic Types. By FREDERICK M'COY, F.G.S., Hon. F.C.P.S., Professor of Natural History in the University of Melbourne, Author of "Characters of the Carboniferous Limestone Fossils of Ireland," "Synopsis of the Silurian Fossils of Ireland," one of the Authors of "Sedgwick and M'Coy's British Palæozoic Rocks and Fossils," &c.

M'COY.—Preparing for Publication, in One Volume, crown 8vo. with numerous Illustrations,

An Elementary Introduction to the Study of Palæontology.
With numerous Figures illustrative of Structural Details.

*** This little Work is intended to supply all that elementary information on the Structure of Fossil Animals, with reference to the most nearly allied existing types, illustrated explanation of technical terms, &c. which the beginner may require, but which would be out of place in the Author's systematic volume on the Genera.

M'COY.—Contributions to British Palæontology; or, First Descriptions of several hundred Fossil Radiata, Articulata, Mollusca, and Pisces, from the Tertiary, Cretaceous, Oolitic, and Palæozoic Strata of Great Britain. With numerous Woodcuts. 8vo. cloth, 9s.

*** This forms a complete Series of the Author's Papers from the "Annals of Natural History."

MASSON.—Essays, Biographical and Critical; chiefly on the English Poets. By DAVID MASSON, M.A. Professor of English Literature in University College, London. 8vo. cloth, 12s. 6d.

MAURICE.—A Photograph Portrait of Rev. F. D. Maurice. 4to. price 6*s.*

MAURICE.—Lectures on the Ecclesiastical History of the First and Second Centuries. By FREDERICK DENISON MAURICE, M.A. Chaplain of Lincoln's Inn. 8vo. cloth, 10*s.* 6*d.*

MAURICE.—The Unity of the New Testament, being a Synopsis of, and Commentary on, the first three Gospels, and the Epistles of St. James, St. Jude, St. Peter, and St. Paul. 8vo. cloth, 14*s.*

MAURICE.—Patriarchs and Lawgivers of the Old Testament. **Second Edition.** With new Preface. Crown 8vo. cloth, 6*s.*

MAURICE.—The Prophets and Kings of the Old Testament. Crown 8vo. cloth. **Second Edition.** 10*s.* 6*d.*

MAURICE.—Theological Essays. **Second Edition,** with a new Preface and other additions. Crown 8vo. cloth, 10*s.* 6*d.*

MAURICE.—The Doctrine of Sacrifice deduced from the Scriptures. With a Dedicatory Letter to the Young Men's Christian Association. Crown 8vo. cloth, 7*s.* 6*d.*

MAURICE.—Christmas Day, and other Sermons. 8vo. cloth, 10*s.* 6*d.*

MAURICE.—The Religions of the World, and their relations to Christianity. **Third Edition.** Fcap. 8vo. cloth, 5*s.*

MAURICE.—The Prayer-Book considered, especially in reference to the Romish System. **Second Edition.** Fcap. 8vo. cloth, 5*s.* 6*d.*

MAURICE.—The Church a Family. Twelve Sermons on the Occasional Services of the Prayer-Book. Fcap. 8vo. cloth, 4*s.* 6*d.*

MAURICE.—On the Lord's Prayer. **Third Edition.** Fcap. 8vo. cloth, 2*s.* 6*d.*

MAURICE.—On the Sabbath Day: the Character of the Warrior; and on the Interpretation of History. Fcap. 8vo. cloth, 2*s.* 6*d.*

MAURICE.—Learning and Working.—Six Lectures delivered in Willis's Rooms, London, in June and July, 1854. **The Religion of Rome, and its influence on Modern Civilization.**—Four Lectures delivered in the Philosophical Institution of Edinburgh, in December 1854. In One Volume, Crown 8vo. cloth. 5*s.*

MAURICE.—An Essay on Eternal Life and Eternal Death, and the Preface to the new Edition of "Theological Essays." Crown 8vo. sewed, 1*s.* 6*d.*

*** Published separately for the purchasers of the first edition.

MAURICE.—Death and Life. A Sermon Preached in the Chapel of Lincoln's Inn, March 25, 1855. **In Memoriam C. B. M.** 8vo. sewed, 1*s.*

MAURICE.—Plan of a Female College for the Help of the Rich and of the Poor. A Lecture delivered at the Working Men's College, London, to a Class of Ladies. 8vo. 6*d*.

MAURICE.—Administrative Reform.
A Lecture delivered at the Working Men's College, London. Crown 8vo. 3*d*.

MAURICE.—The Word "Eternal," and the Punishment of the Wicked. A Letter to the Rev. Dr. Jelf, Principal of King's College. London. **Fifth Thousand.** 8vo. 1*s*.

MAURICE.—The Name "Protestant:" the Seemingly Double Character of the English Church; and the English Bishopric at Jerusalem. Three Letters to the Rev. Wm. Palmer, Fellow and Tutor of Magdalen College, Oxford. **Second Edition.** 8vo. 3*s*.

MAURICE.—On Right and Wrong Methods of Supporting Protestantism. A Letter to Lord Ashley. 8vo. 1*s*.

MAURICE.—Thoughts on the Duty of a Protestant, in the Oxford Election of 1847. 8vo. 1*s*.

MAURICE.—The Case of Queen's College, London.
A Letter to the Lord Bishop of London, in reply to the "Quarterly Review." 8vo. 1*s*. 6*d*.

MAURICE.—Lectures on Modern History and English Literature. [*Preparing.*

MAURICE.—Law's Remarks on the Fable of the Bees, with an Introduction of Eighty Pages by FREDERICK DENISON MAURICE, M.A. Chaplain of Lincoln's Inn. Fcp. 8vo. cloth, 4*s*. 6*d*.

"This introduction discusses the Religious, Political, Social, and Ethical Theories of our day, and shows the special worth of Law's method, and how far it is applicable to our circumstances."

MINUCIUS FELIX.—The Octavius of Minucius Felix.
Translated into English by LORD HAILES. Fcp. 8vo. cloth, 3*s*. 6*d*.

NAPIER.—Lord Bacon and Sir Walter Raleigh.
Critical and Biographical Essays. By MACVEY NAPIER, late Editor of the *Edinburgh Review* and of the *Encyclopædia Britannica*. Post 8vo. cloth, 7*s*. 6*d*.

NIND.—Sonnets of Cambridge Life. By Rev. W. NIND, M.A. Fellow of St. Peter's College. Post 8vo. boards, 2*s*.

NIND.—The German Lyrist; or, Metrical Versions from the principal German Lyric Poets. By Rev. W. NIND, Fellow of St. Peter's College. Crown 8vo. cloth, 3*s*.

NORRIS.—Ten School-Room Addresses.
Edited by J. P. NORRIS, M.A. Fellow of Trinity College, and one of Her Majesty's Inspectors of Schools. 18mo. sewed, 8*d*.

PARKINSON.—A Treatise on Elementary Mechanics.
For the Use of the Junior Classes at the University, and the Higher Classes in Schools. With a collection of Examples. By S. PARKINSON, M.A. Fellow and Assistant Tutor of St. John's College, Cambridge. Crown 8vo. cloth, *9s. 6d.*

PARMINTER.—Materials for a Grammar of the Modern
English Language. Designed as a Text-book of Classical Grammar for the use of Training Colleges, and the Higher Classes of English Schools. By GEORGE HENRY PARMINTER, of Trinity College, Cambridge; Rector of the United Parishes of SS. John and George, Exeter. Fcap. 8vo. cloth, *3s. 6d.*

PAYN.—Poems.
By JAMES PAYN. Fcp. 8vo. cloth, *5s.*

PEACE IN WAR. In Memoriam L. K.
Crown 8vo. sewed, *1s.*

PEARSON.—Elements of the Calculus of Finite Differences,
treated on the Method of the Separation of Symbols. By J. PEARSON, M.A. Rector of St. Edmund's, Norwich, Mathematical Master of Norwich Grammar School, and formerly Scholar of Trinity College, Cambridge. **Second Edition,** enlarged. 8vo. *5s.*

PEROWNE.—"Al-Adjrumiieh."
An Elementary Arabic Grammar, with a Translation. By J. J. S. PEROWNE, M.A. Fellow of Corpus Christi College, Cambridge, and Lecturer in Hebrew in King's College, London. 8vo. cloth, *5s.*

PERRY.—Five Sermons Preached before the University of
Cambridge, in November 1855. By the Right Rev. CHARLES PERRY, Lord Bishop of Melbourne, formerly Fellow and Tutor of Trinity College, Cambridge. Crown 8vo. cloth, *3s.*

PHEAR.—Elementary Mechanics.
Accompanied by numerous Examples solved Geometrically. By J. B. PHEAR, M.A., Fellow and Mathematical Lecturer of Clare Hall, Cambridge. 8vo. cloth, *10s. 6d.*

PHEAR.—Elementary Hydrostatics.
Accompanied by numerous Examples. Crown 8vo. cloth, *5s. 6d.*

PLATO.—The Republic of Plato.
Translated into English, with Notes. By Two Fellows of Trinity College, Cambridge, (J. Ll. Davies M.A., and D. J. Vaughan, M.A.) Crown 8vo. cloth, *7s. 6d.*

POWELL.—The Scriptural Doctrine of the Influence of the
Holy Ghost, as Illustrated by the Analogy of Nature. The Burney Prize Essay for the year 1853. 8vo, sewed, *2s. 6d.*

PRATT.—The Mathematical Principles of Mechanical Philosophy. By J. H. PRATT, M.A., Fellow of Caius College.

*** *The above work is now out of Print: but the Part on* STATICS *has been re-edited by Mr. Todhunter, with numerous alterations and additions: the Part on* DYNAMICS, *by Messrs. Tait and Steele, is just published.* The other parts will be published in separate forms, improved and altered as may seem needful.

PRINCIPLES of ETHICS according to the NEW TESTAMENT. Crown 8vo. *2s.*

PROCTER.—A History of the Book of Common Prayer: with a Rationale of its Offices. By FRANCIS PROCTER, M.A., Vicar of Witton, Norfolk, and late Fellow of St. Catharine Hall. Crown 8vo. cloth, *10s. 6d.*

*** This is part of a series of Theological Manuals, now in progress.

PUCKLE.—An Elementary Treatise on Conic Sections and Algebraic Geometry. With a numerous collection of Easy Examples progressively arranged, especially designed for the use of Schools and Beginners. By G. HALE PUCKLE, M.A., St. John's College, Cambridge; Principal of Windermere College. Crown 8vo. cloth, *7s. 6d.*

PURTON.—The Acts of the Apostles.
With a Paraphrase and Exegetical Commentary. By JOHN SMYTH PURTON, M.A. Fellow and Tutor of St. Catherine's Hall, Cambridge. 8vo. [*Preparing.*

RAMSAY.—The Catechiser's Manual; or, the Church Catechism illustrated and explained, for the use of Clergymen, Schoolmasters, and Teachers. By ARTHUR RAMSAY, M.A. of Trinity College, Cambridge. 18mo. cloth, *3s. 6d.*

REICHEL.—The Lord's Prayer and other Sermons.
By C. P. REICHEL, B.D., Professor of Latin in the Queen's University; Chaplain to his Excellency the Lord Lieutenant of Ireland; and late Donnellan Lecturer in the University of Dublin. Crown 8vo. cloth, *7s. 6d.*

ROBINSON.—Missions urged upon the State on grounds both of Duty and Policy. An Essay which obtained the Maitland Prize in the year 1852. By C. K. ROBINSON, M.A., Fellow and Assistant Tutor of St. Catharine's Hall, Cambridge. Fcp. 8vo. cloth, *3s.*

ROSE (Henry John).—An Exposition of the Articles of the Church of England. By HENRY JOHN ROSE, B.D. late Fellow of St. John's College, and Hulsean Lecturer in the University of Cambridge. [*Preparing.*

*** This is part of a Series of Theological Manuals now in progress.

SALLUST.—Sallust.
The Latin Text, with English Notes. By CHARLES MERIVALE, B.D., late Fellow and Tutor of St. John's College, Cambridge, &c., Author of a "History of Rome," &c. Crown 8vo. cloth, *5s.*

SEDGWICK AND M'COY'S British Palæozoic Fossils,
Part I. 4to. sewed, 16*s*.

——— Part II. 4to. sewed, 10*s*.

——— Part III. completing the work, 16*s*. just ready.

*** THE WHOLE BOUND IN TWO VOLS., *4to. cloth*, *£2 2s*.

SELWYN.—The Work of Christ in the World. Four Sermons,
preached before the University of Cambridge, on the four Sundays preceding Advent in the year of our Lord 1854. By the Right Rev. GEORGE AUGUSTUS SELWYN, D.D. Bishop of New Zealand, formerly Fellow of St. John's College. **Third Edition.** Crown 8vo. 2*s*.

SELWYN.—A Verbal Analysis of the Holy Bible.
Intended to facilitate the translation of the Holy Scriptures into Foreign Languages. Compiled by THE BISHOP OF NEW ZEALAND, for the use of the Melanesian Mission. Small folio, cloth, 14*s*.

SIMPSON.—An Epitome of the History of the Christian
Church during the first Three Centuries and during the Time of the Reformation, adapted for the use of Students in the Universities and in Schools. By WILLIAM SIMPSON, M.A. With Examination Questions. **Second Edition,** Improved. Fcp. 8vo. cloth, 5*s*.

SMITH.—Arithmetic and Algebra, in their Principles and
Application: with numerous systematically arranged Examples, taken from the Cambridge Examination Papers. With especial reference to the ordinary Examination for B.A. Degree. By BARNARD SMITH, M.A., Fellow of St. Peter's College, Cambridge. **Third Edition,** enlarged and revised throughout. Crown 8vo. cloth, 10*s*. 6*d*.

SMITH.—Arithmetic for the use of Schools. By BARNARD
SMITH, M.A. Fellow of St. Peter's College. **Third Thousand,** with Additions. Crown 8vo. cloth, 4*s*. 6*d*.

*** This has been published in accordance with very numerous requests from Schoolmasters and Inspectors of Schools. It comprises a complete reprint of the Arithmetic from Mr. Smith's larger work, with such alterations as were necessary in separating it from the Algebra, and references throughout to the *Decimal System of Coinage*.

SMITH.—A Key to Mr. Smith's Arithmetic for Schools.
Crown 8vo. cloth, 8*s*. 6*d*.

SMITH.—Mechanics and Hydrostatics, in their Principles
and Application: with numerous systematically arranged Examples, taken from the Cambridge Examination Papers. With a special reference to the Ordinary Examination for B.A. Degree. By BARNARD SMITH, M.A. Fellow of St. Peter's College, Cambridge. [*Preparing.*

SNOWBALL.—The Elements of Plane and Spherical
Trigonometry. Greatly improved and enlarged. By J. C. SNOWBALL, M.A. Fellow of St. John's College, Cambridge. **Eighth Edition,** with Additions and Improvements. Crown 8vo. cloth, 7*s*. 6*d*.

SWAINSON.—A Hand Book to Butler's Analogy.

With a few Notes. By C. A. SWAINSON, M.A. Principal of the Chichester Theological College, formerly Fellow and Tutor of Christ's College, Cambridge, and Preacher at Whitehall. Crown 8vo. 1*s*. 6*d*.

TAIT and STEELE.—A Treatise on Dynamics, with numerous Examples.

By P. G. TAIT, Fellow of St. Peter's College, and Professor of Mathematics in Queen's College, Belfast, and W. J. STEELE, Fellow of St. Peter's College. Crown 8vo. cloth, 10*s*. 6*d*. [*Just ready.*

This is a new Edition of that part of Pratt's Mechanical Philosophy which treats of Dynamics, with large additions and improvements.

TAYLOR.—The Restoration of Belief.

By ISAAC TAYLOR. Crown 8vo. cloth, 8*s*. 6*d*.

CONTENTS. I.—Christianity in relation to its Ancient and Modern Antagonists. II.—On the Supernatural Element contained in the Epistles, and its bearing on the argument. III.—The Miracles of the Gospels considered in their relation to the principal features of the Christian Scheme.

THEOCRITUS.—Theocritus.

The Greek Text, with English notes, Critical an Explanatory, for the use of Colleges and Schools. By E. H. PEROWNE, M.A., Fellow of Corpus Christi College. Crown 8vo. [*Preparing.*

THEOLOGICAL Manuals.

Just published:—

CHURCH HISTORY: THE MIDDLE AGES. By CHARLES HARDWICK. With Four Maps. Crown 8vo. cloth, price 10*s*. 6*d*.

THE COMMON PRAYER: ITS HISTORY AND RATIONALE. By FRANCIS PROCTER. Crown 8vo. cloth, 10*s*. 6*d*.

A HISTORY OF THE CANON OF THE NEW TESTAMENT. By B. F. WESTCOTT. Crown 8vo. cloth, 12*s*. 6*d*.

CHURCH HISTORY: THE REFORMATION. By CHARLES HARDWICK. Crown 8vo. cloth, 10*s*. 6*d*.

The following will shortly appear:—

INTRODUCTION TO THE STUDY OF THE OLD TESTAMENT.
NOTES ON ISAIAH.
INTRODUCTION TO THE STUDY OF THE GOSPELS.
———————————— EPISTLES.
NOTES ON THE GOSPELS AND ACTS.
———————— EPISTLES AND APOCALYPSE.
CHURCH HISTORY, THE FIRST SIX CENTURIES.
———————— 17TH CENTURY TO THE PRESENT TIME.
THE THREE CREEDS.
THE THIRTY-NINE ARTICLES.

*** Others are in progress, and will be announced in due time.

THRING.—A Construing Book.

Compiled by the Rev. EDWARD THRING, M.A. late Fellow of King's College, Cambridge, and Head Master of Uppingham School. Fcap. 8vo. cloth, 2*s*. 6*d*.

THRING.—The Elements of Grammar taught in English.
By EDWARD THRING, M.A. Head Master of the Royal Grammar School, Uppingham; late Fellow of King's College, Cambridge. **Second Edition.** 18mo. bound in cloth, 2*s.*

THRING.—The Child's Grammar.
Being the substance of the above, with Examples for Practice. Adapted for Junior Classes. **A New Edition.** 18mo. lymp cloth, 1*s.*

THRUPP.—Psalms and Hymns for Public Worship. Selected
and Edited by JOSEPH FRANCIS THRUPP, M.A. Vicar of Barrington, late Fellow of Trinity College. 18mo. cloth, 2*s.* Second paper in lymp cloth, 1*s.* 4*d.*

THRUPP.—Antient Jerusalem: a New Investigation into the
History, Topography, and Plan of the City, Environs, and Temple. Designed principally to illustrate the records and prophecies of Scripture. With Map and Plans. By JOSEPH FRANCIS THRUPP, M.A. Vicar of Barrington, Cambridge, late Fellow of Trinity College. 8vo. cloth, 15*s.*

TODHUNTER.—A Treatise on the Differential Calculus; and
the Elements of the Integral Calculus. With numerous Examples. By I. TODHUNTER, M.A., Fellow and Tutor of St. John's College, Cambridge. **Second Edition.** Crown 8vo. cloth, 10*s.* 6*d.*

TODHUNTER. — A Treatise on Analytical Statics, with
numerous Examples. Crown 8vo. cloth, 10*s.* 6*d.*

TODHUNTER.—A Treatise on Conic Sections. With
numerous Examples. For the Use of Colleges and Schools. Crown 8vo. cloth, 10*s.* 6*d.*

TODHUNTER.—A Treatise on Algebra, for the Use of
Students in the Universities, and of the Higher Classes in Schools. [*Prep.*

Also by the same Author,

An Elementary Work on the same subject, for the use of
Beginners.

TRENCH.—Synonyms of the New Testament.
By RICHARD CHENEVIX TRENCH, B.D., Vicar of Itchenstoke, Hants, Professor of Divinity, King's College, London, and Examining Chaplain to the Bishop of Oxford. **Third Edition,** revised. Fcp. 8vo. cloth, 5*s.*

TRENCH.—Hulsean Lectures for 1845—46.
CONTENTS. 1.—The Fitness of Holy Scripture for unfolding the Spiritual Life of Man. 2.—Christ the Desire of all Nations; or the Unconscious Prophecies of Heathendom. **Third Edition.** Foolscap 8vo. cloth, 5*s.*

For VERIFYING DATES.
A perpetual Almanac for determining Dates past, present, and future; with a Lunar Kalendar and Tables of the more important Periods, Æras, Festivals, and Anniversaries. Price 6*d.*

*** This is so printed, that if the margin be cut off it may be carried in a pocket-book.

WATERS OF COMFORT.—A Small Volume of Devotional
Poetry of a Practical Character. By the Author of "Visiting my Relations." Fcap. 8vo. cloth, 4*s.*

WESTCOTT.—A general View of the History of the Canon of the New Testament during the First Four Centuries. By BROOKE FOSS WESTCOTT, M.A., Assistant Master of Harrow School; late Fellow of Trinity College, Cambridge. Crown 8vo. cloth, 12*s.* 6*d.*

WESTCOTT.—An Introduction to the Study of the Gospels; including a new and improved Edition of "The Elements of the Gospel Harmony." With a Catena on Inspiration, from the Writings of the Ante-Nicene Fathers. Crown 8vo. [*Preparing.*

WESTCOTT.—An Introduction to the Study of the Canonical Epistles; including an attempt to determine their separate purposes and mutual relations. By BROOKE FOSS WESTCOTT, M.A. [*Preparing.*

*** These three books are part of a series of Theological Manuals now in progress.

WILSON.—A Treatise on Dynamics.

By W. P. WILSON, M.A., Fellow of St. John's, Cambridge, and Professor of Mathematics in the University of Melbourne. 8vo. bds. 9*s.* 6*d.*

WRIGHT.—Hellenica; or, a History of Greece in Greek, beginning with the Invasion of Xerxes; as related by Diodorus and Thucydides. With Explanatory Notes, Critical and Historical, for the use of Schools. By J. WRIGHT, M.A., of Trinity College, Cambridge, and Head-Master of Sutton Coldfield Grammar School. 12mo. cloth, 3*s.* 6*d.*

*** This book is already in use in Rugby and other Schools.

WRIGHT.—A Help to Latin Grammar;

or, the Form and Use of Words in Latin. With Progressive Exercises. By J. WRIGHT, M.A. Crown 8vo. cloth, 4*s.* 6*d.*

WRIGHT.—The Seven Kings of Rome:

An easy Narrative, abridged from the First Book of Livy by the omission of difficult passages, so as to make a First Construing Book for Beginners of Latin. With Grammatical Notes. By J. WRIGHT, M.A. [*Nearly ready.*

THE JOURNAL OF CLASSICAL AND SACRED PHILOLOGY.

No. VIII. for June 1856, 4*s.*

Vol. I. for 1854, and Vol. II. for 1855, are now ready, cloth lettered, 12*s.* 6*d.* each.

CASES CAN BE HAD FOR BINDING VOLS. I. AND II.

*** Three Numbers published annually, at 4*s.* each.

Cambridge: MACMILLAN & Co.
London: BELL & DALDY, 186, FLEET-STREET.
Edinburgh: EDMONSTON & DOUGLAS. Oxford: J. H. & JAS. PARKER.
Dublin: WILLIAM ROBERTSON. Glasgow: JAS. MACLEHOSE.

R. CLAY, PRINTER, BREAD STREET HILL.

cies.

missic

GY.

f. each.

KER.